Drinking Water Surveillance Program

CAYUGA WATER TREATMENT PLANT

Annual Report 1988

Environment Canada

ISSN 0843-8323

91-02700/

CAYUGA
WATER TREATMENT PLANT

DRINKING WATER SURVEILLANCE PROGRAM

ANNUAL REPORT 1988

FEBRUARY 1990

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EXECUTIVE SUMMARY

DRINKING WATER SURVEILLANCE PROGRAM

CAYUGA WATER TREATMENT PLANT
1988 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 52 plants are being monitored.

The Cayuga Water Treatment Plant is a direct filtration plant which treats water from the Grand River. The process consistS of coagulation, flocculation, clarification (upflow clarifier), filtration and disinfection. Sodium Silicate or a polyelectrolyte are added as coagulant aid as necessary. This plant has a design capacity of 1.09 x 1000 m^3/day and serves a population of approximately 1,100.

Samples of the raw and treated water at the plant and at one distribution system site were taken on a monthly basis beginning in January and analyzed for approximately 160 parameters. Parameters were divided into the following groups Bacteriological, Inorganic and Physical(Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed in June and November only.

A summary of results is shown in Table 1.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

During 1988 the DWSP sampling results indicated that the Cayuga Water Treatment Plant produced good quality water at the plant and this quality was maintained in the distribution system.

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP

SUMMARY TABLE BY SCAN

SCAN	RAW			TREATED			SITE 1		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	29	28	96	45	17	37	32	15	46
CHEMISTRY (FLD)	28	28	100	59	59	100	33	33	100
CHEMISTRY (LAB)	225	205	91	206	173	83	288	261	90
METALS	218	146	66	240	131	54	377	228	60
CHLOROAROMATICS	140	0	0	154	0	0	126	0	0
CHLOROPHENOLS	12	0	0	12	0	0	.	.	.
PAH	187	10	5	187	0	0	.	.	.
PESTICIDES & PCB	340	1	0	362	1	0	296	0	0
PHENOLICS	10	4	40	10	6	60	.	.	.
SPECIFIC PESTICIDES	56	0	0	56	0	0	0	0	0
VOLATILES	229	1	0	200	27	13	172	24	13
TOTAL	1474	423		1531	414		1324	561	

NO HEALTH RELATED GUIDELINES WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE
A '.' INDICATES THAT NO SAMPLE WAS TAKEN

DRINKING WATER SURVEILLANCE PROGRAM

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INTRODUCTION

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 52 plants are being monitored. Appendix A contains a detailed description of the DWSP.

The DWSP was initiated at the plant and at one location in the Cayuga distribution system in January 1988.

This report contains information and results for 1988.

PLANT DESCRIPTION

The Cayuga Water Treatment Plant is a direct filtration plant which treats water from the Grand River. The process consists of coagulation, flocculation, clarification (upflow clarifier), filtration and disinfection. Activated silica is added as a coagulant aid when necessary. This plant has a design capacity of

1.09 x 1000 m^3/day and flows on day of sampling ranging from 0.4 x 1000 m^3/day to 0.9 x 1000 m^3/day. It serves a population of approximately 1,100.

The plant location is shown in Figure 1. Plant process details, in a block schematic, are shown in Figure 2. General plant information is presented in Table 2.

METHODS

Water samples were obtained from three DWSP approved locations;

i) Plant Raw - The water originated from the raw water lowlift discharge after the chlorinator had been turned off and prior to the addition of any other chemicals. Water was sampled through a stainless steel sample line.

ii) Plant Treated - The water originated at the highlift discharge after addition of all treatment chemicals and was sampled through a stainless steel sample line. The sample tap is located in the plant laboratory.

iii) Distribution System - Site 1 - The distance of the house from the plant is unavailable. The material of the house plumbing is unavailable.

Sample lines in the plant were flushed prior to sampling to ensure

FIGURE 1

DRINKING WATER SURVEILLANCE PROGRAM

SITE LOCATION MAP

CAYUGA WATER TREATMENT PLANT

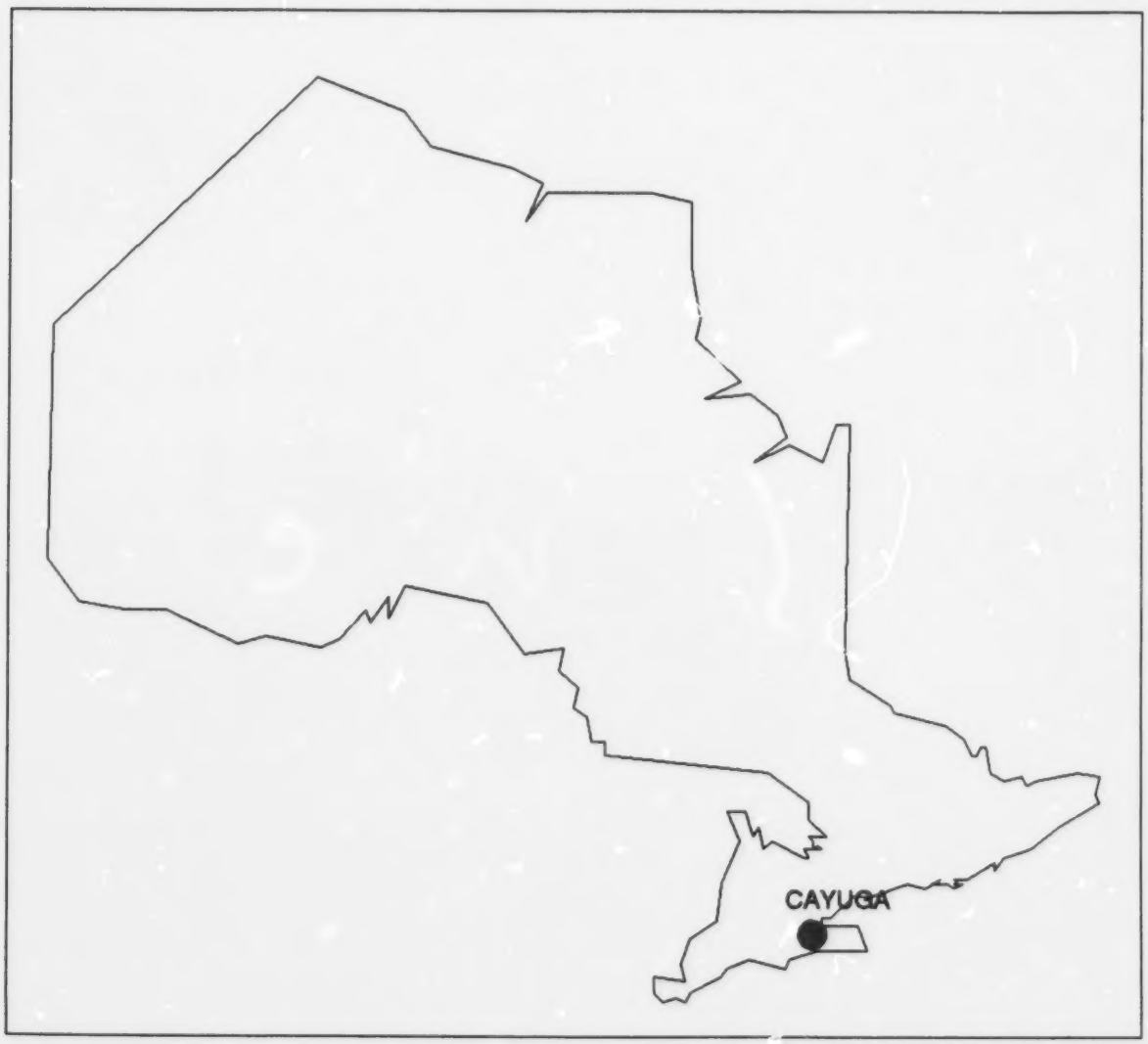

FIGURE 2

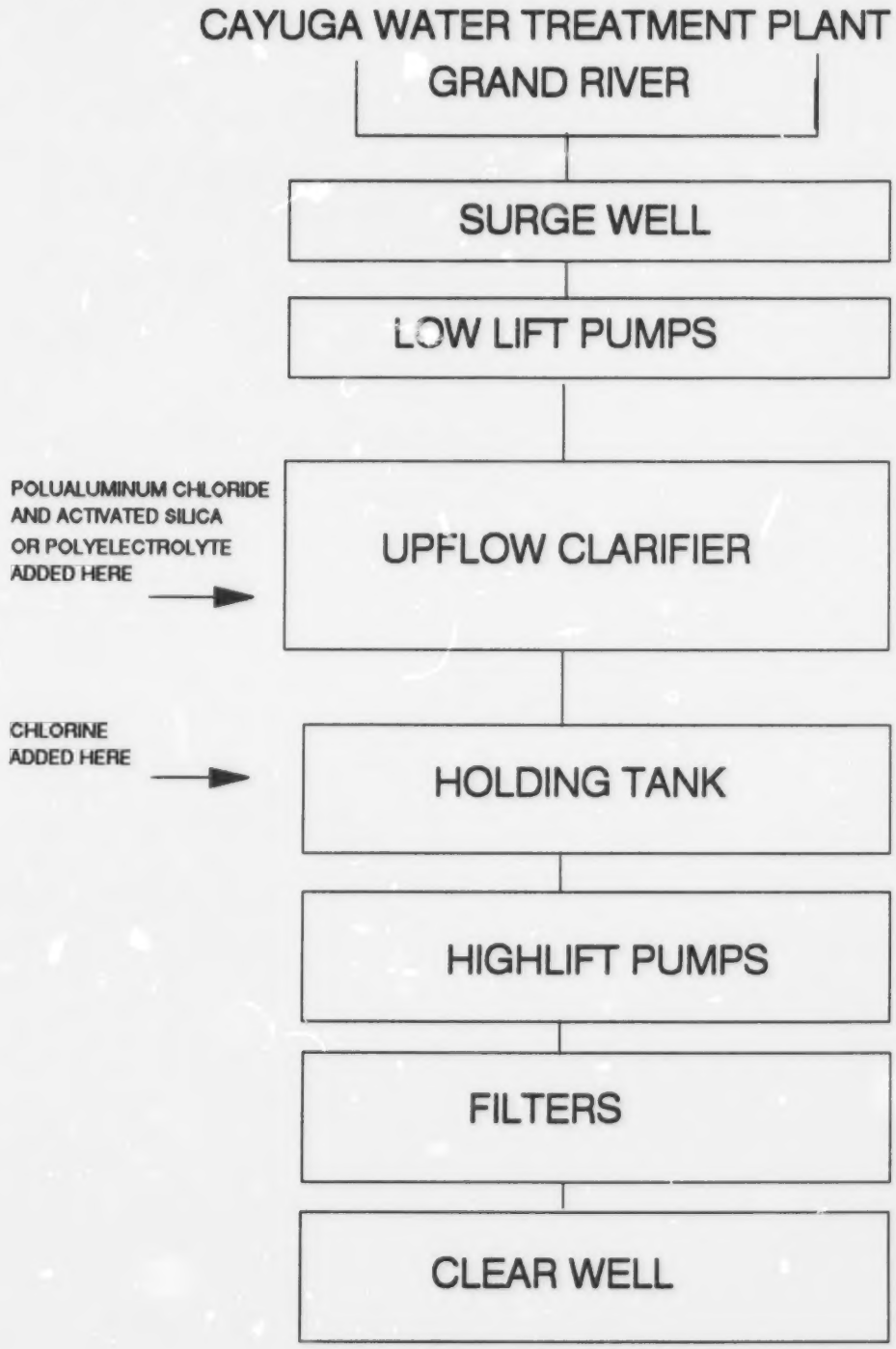
CAYUGA WATER TREATMENT PLANT
GRAND RIVER
SURGE WELL
LOW LIFT PUMPS
POLUALUMINUM CHLORIDE AND ACTIVATED SILICA OR POLYELECTROLYTE ADDED HERE
UPFLOW CLARIFIER
CHLORINE ADDED HERE
HOLDING TANK
HIGHLIFT PUMPS
FILTERS
CLEAR WELL

TABLE 2

DRINKING WATER SURVEILLANCE PROGRAM ANNUAL REPORT

GENERAL INFORMATION

CAYUGA WATER TREATMENT PLANT

LOCATION:	HIGHWAY 54 NORTH CAYUGA, ONTARIO (MAIL) BOX 70, TOWN CENTER DRIVE TOWNSEND
SOURCE:	RAW WATER SOURCE - GRAND RIVER
DESIGN CAPACITY:	1.09 (1000 M^3/DAY)
OPERATION:	MINISTRY
PLANT SUPERINTENDENT:	R. BARRY
MINISTRY REGION:	WEST CENTRAL
DISTRICT OFFICER:	MR. B. CREAMER

MUNICIPALITY SERVED	POPULATION
CAYUGA	1,100

that the water obtained was indicative of its origin and not residual water standing in the sample line.

At the distribution system location two types of samples were obtained: a standing and a free flow. The standing sample consisted of water that had been in the household plumbing and service connection for a minimum of six hours. These samples are used to make an assessment of the amount by which the levels of inorganic compounds and metals may be changed on standing, due to leaching from (or deposition on), the plumbing system. The only analyses carried out on the standing samples therefore, are General Chemistry and Metals. The free flow sample represented fresh water from the distribution main that had been flowing at the sample tap for five minutes before being sampled.

Attempts were made to capture the same block of water at each sampling point by taking the retention time into consideration. The retention time was calculated by dividing the volume of water between the two sampling points by the sample day flow. For example, if it was determined that the retention time within the plant was five hours then there would be a five hour interval between the raw and treated sampling. Similarly, if it was estimated that it took approximately one day for the water to travel from the plant to the distribution system site, this site would be sampled one day after the treated water from the plant.

Stringent DWSP sampling protocols were followed to ensure that all samples were taken in a uniform manner (Appendix B).

Sample day flows, treatment chemical dosages and Field Chemistry measurements were recorded on the day of sampling and were entered onto the DWSP data base as submitted.

RESULTS

The raw and treated water at the treatment plant and one site in the distribution system were sampled monthly in 1988 beginning in January. Specific Pesticides and Chlorophenols were sampled in June and November only. Polynuclear Aromatic Hydrocarbons and Phenolics were only analysed in the raw and treated water at the plant. As a result of an unforeseen emergency the laboratory capacity was exceeded and analysis for volatiles could not be carried out when the samples were received. Since analysis for volatiles is no longer valid after four weeks of storage, volatile results for February or March are not available.

Table 3 contains information on the sample day retention time, flow rate and treatment chemicals used and their associated dosages.

Table 4 is a summary break-down of the number of water samples analysed by parameter and by water type. The number of times that a positive or trace result was detected is also reported.

Positive denotes that the result is greater than the statistical limit of detection established by the Ministry of the Environment (MOE) laboratory staff and is quantifiable. Trace (<T) denotes that the level measured is greater than the lowest value detectable by the method but lies so close to the detection limit that it cannot be confidently quantified.

Table 5 presents the results for parameters detected on at least one occasion.

Table 6 lists all parameters analysed in the DWSP.

Associated guidelines and detection limits are also supplied on tables 5 and 6. Parameters are listed alphabetically within each scan.

DISCUSSION

General

Water quality is judged by comparison with the Ontario Drinking Water Objectives (ODWOs) as defined in the 1984 publictaion (ISBN 0-7743-8985-0). The Province of Ontario has health related and aesthetic objectives for 49 parameters, these are currently under review. When an ODWO is not available guidelines/limits from other agencies are consulted. The Parameter Listing System (PALIS)

recently published (ISBN 0-7729-4461-X) by the MOE catalogues and keeps current over 1750 guidelines for 650 parameters from agencies throughout the world.

Although some of the parameters measured on DWSP may be present in the raw and treated water as a result of pollution, many of the compounds detected are naturally occurring or are treatment by-products.

Plant operational personnel address occurrences of taste and odour or biological water quality parameters. The DWSP does not assess these aspects of the water supply.

As stated under Results, traces do not indicate quantifiable results as defined by established MOE laboratory analytical reporting protocols. While they can be useful in trend analysis or confirmation of the presence of a specific contaminant that is repeatedly detected at these levels, the occasional finding of a trace level of a contaminant is not considered to be significant. **DISCUSSION OF GUIDELINES AND LIMITS THEREFORE, IS ONLY CONDUCTED ON POSITIVE RESULTS.**

Bacteriological

Positive results for the Bacteriology scan were present 17 times in the treated water and 15 times in the Site 1 water. In most

cases the positive parameters were Standard Plate Count, Total Coliform and/or Total Coliform Background.

The presence/absence (P.A.) test determined Coliform bacteria to be present within 48 hours in the January and February treated water samples; Total Coliforms were not detected by the membrane filtration test for these months. Fecal coliforms and Escherichia Coli were determined to be present in the January treated water sample by the Presence/Absence test. The District Officer was notified. Coliforms were detected by the membrane filtration test in the October treated water sample at 3 counts/100 mL and in the July Site 1 water at 1 count/100 mL.

Standard Plate Count is a test used to supplement routine analysis for Coliform bacteria. The limit for Standard Plate Count (at 35°C after 48 hours) in the ODWOs is 500 organisms per mL (based on a geometric mean of 5 or more samples). High Standard Plate Counts were present in the July and September Site 1 water samples. While no indicators of unsafe water were detected at this time, the high Standard Plate Count may be indicative of a deterioration in conditions in the distribution system. Neither of the samples contained bacteriological results over any applicable health related ODWOs.

Guidelines for bacteriological sampling and testing of a supply are developed to maintain a proper supervision of its bacteriological

quality; the routine monitoring program usually requires the taking of multiple samples in a given system. Full interpretation of bacteriological quality cannot be made on the basis of single samples. Further, bacteriological limits were developed in acknowledgement that the presence of coliforms may be detected due to their non-uniform distribution throughout the distribution system and the fact that their enumeration is subject to considerable variation. For these reasons, the occasional finding of low numbers of coliform organisms is not unexpected. Routine bacteriological monitoring, as outlined in the ODWOs is carried out by the operating authority.

Inorganic and Physical Parameters

Laboratory and Field Chemistry

The results for the Laboratory Chemistry and Field Chemistry scans were below applicable health related ODWOs.

There are also ODWOs that are set for parameters which are related to aesthetic quality rather than health.

Colour values exceeded the aesthetic ODWO of 5 True Colour Units (TCU) three times in the treated water and in all samples of the Site 1 free flow water. Colour in drinking water may be due to the presence of natural or synthetic organic substances as well as certain metallic ions.

It is desirable that the Temperature of drinking water be less than 15°C; the palatability of water is enhanced by its coolness. A temperature below 15°C will tend to reduce the growth of nuisance organisms and hence minimize associated taste, colour, odour and corrosion problems. The temperature of the delivered water may increase in the distribution system due to the warming effect of the soil in late summer and fall and/or as a result of higher temperatures in the source water. The desired ODWO was exceeded from June to October in the treated water at the plant and in the August and September free flow distributed water samples.

Turbidity in water is caused by the presence of suspended matter such as clay, silt, colloidal particles, plankton and other microscopic organisms. The most important potential health effect of Turbidity is its interference with disinfection in the treatment plant and the maintenance of a chlorine residual. The ODWO of 1 Formazin Turbidity Unit (FTU) is only applicable to treated water leaving the plant. The laboratory turbidity values for the June and October treated water samples of 1.47 FTU and 1.16 FTU respectively were not supported by the field turbidity values.

The ODWOs indicate that a hardness level of between 80 and 100 mg/L as calcium carbonate for domestic waters, provides an acceptable balance between corrosion and incrustation. Water supplies with a hardness greater than 200 mg/L are considered poor and would

possess a tendency to form scale deposits and result in excessive soap consumption. The source water at Cayuga is the Grand river, the watershed of which drains a limestone area; hardness components would thus tend to be leached from the surrounding geological formations. Hardness levels at Cayuga were consistently between 247 mg/L and 368 mg/L.

The European Economic Community (EEC) aesthetic guideline level for Conductivity of 400 UMHO/cm was exceeded in all of the water samples, and is a result of the high hardness levels.

The Langelier Index is used extensively in estimating the corrosion potential of water. An increasingly negative index indicates the increasing possibility of corrosion. It is considered sound engineering practice to maintain a slightly positive Langelier Index. The Langelier Index for Cayuga is consistently positive.

Metals

The results reported for the Metals scan were below any applicable health related ODWOs.

Aluminum, Manganese, Iron and Zinc levels were lower in the treated water as compared to the raw. This is a result of the treatment process. The addition of coagulant to the raw water and the resulting coagulation/settling process has been shown to reduce the levels of most metals.

Levels of Copper, Lead and Zinc were slightly elevated in the standing samples as compared to the free flow distribution samples thus, indicating that these metals were leached from the household plumbing as the water stood overnight. Although the Langelier Index indicates minimal potential for corrosion some metals will be leached in standing samples in most supplies.

At present, there is no evidence that Aluminum is physiologically harmful and no health limit for drinking water has been specified. The measure of residual Aluminum in the treated water is important to indicate the efficiency of the treatment process. The ODWOs indicate that a useful guideline is to maintain a residual below 100 ug/L as Al in the water leaving the plant to avoid problems in the distribution system. Aluminum values exceeded the ODWO operational guideline eight times in the treated water although the levels were reduced from those of the raw water.

Organic Parameters

Chloroaromatics

The results of the Chloroaromatics scan showed that no chloroaromatics were detected.

Chlorophenols

The results of the Chlorophenols scan showed that one parameter

was detected:

2,4,5-Trichlorophenol

2,4,5-Trichlorophenol was detected at a trace level, once in the treated water.

Pesticides and PCB (Polychlorinated Biphenyls)

The results of the Pesticides and PCB scan showed that no PCBs were detected and that four pesticides were detected:

Alpha BHC

Lindane

Atrazine

Des-ethyl Atrazine

There are several isomers of BHC (Benzene Hexachloride); gamma BHC is the active ingredient of the pesticide Lindane , while alpha BHC is the predominant isomer found in surface waters from the Great Lakes Basin as indicated in results from other water supplies on DWSP.

Alpha BHC was detected at trace levels, once in the raw water, three times in the treated water and twice in the Site 1 water.

Lindane was detected at trace levels, four times in the raw water, ten times in the treated water and six times in the Site 1 water.

Atrazine was detected at 550 ng/L in the April raw water sample and 610 ng/L in the treated water. The Interim Maximum Acceptable Concentration (IMAC) set by Health and Welfare Canada for Atrazine in drinking water is 60000 ng/L. Atrazine was also detected at trace levels, four times in the raw water, treated water and Site 1 water.

Des-ethyl Atrazine is a breakdown product of Atrazine. It was detected at trace levels, once in the raw water, once in the treated water and once in the Site 1 water.

Specific Pesticides

Results of the Specific Pesticides scan showed that no parameters were detected.

Phenolics

The maximum desirable concentration of phenolic substances in drinking water is 2.0 ug/L. This limit has been set to prevent the occurrence of undesirable tastes and odours, particularly in chlorinated water. Phenolics were detected in the raw water ranging from 1.0 ug/L to 2.8 ug/L and in the treated water ranging from 1.2 ug/L to 3.2 ug/L. Phenolics were detected at trace levels, four times in the raw water and once in the treated water. Phenolic compounds are present in the aquatic environment as a result of natural and/or industrial processes.

Polynuclear Aromatic Hydrocarbons (PAHs)

Results of the PAH scan showed that ten PAHs were detected:

- **Fluoranthene**
- **Pyrene**
- **Benzo(A) Anthracene**
- **Chrysene**
- **Perylene**
- **Benzo(K) Fluoranthene**
- **Benzo(A) Pyrene**
- **Benzo(G,H,I) Perylene**

Fluoranthene was detected once in the raw water at 80 ng/L.

Pyrene was detected once in the raw water at 80 ng/L.

Chrysene was detected once in the raw water at 100 ng/L.

Perylene was detected once in the raw water at 50 ug/L.

Benzo(K) Fluoranthene was detected once in the raw water at 19 ng/L.

Benzo(A) Pyrene was detected once in the raw water at 35 ng/L.

Benzo(G,H,I) Perylene was detected once in the raw water at 80 ng/L.

Benzo(A,H) Anthracene was deteced once in the raw water at 10 ng/L.

Inden0(1,2,3,C,D) Perylene was detected once in the raw water at 80 ng/L.

All of these PAHs were detected in the April raw water sample; none were detected in the treated water samples. PAHs have a close association with suspended solids; removal of these by conventional treatment to achieve recommended turbidity levels will achieve minimum PAH levels. Concentrations of isolated PAHs in relatively unpolluted river waters typically range from 50 to 250 ng/L.

Volatiles

The results of the Volatiles scan showed that eight parameters, other than Trihalomethanes(THMs), were detected:

Benzene
Toluene
Ethylbenzene
Meta-Xylene
Ortho-Xylene
Styrene
1,2-Dichloroethane
Tetrachloroethylene

Benzene was detected at trace levels, four times in the Site 1

Toluene was detected at trace levels, twice in the treated water. The detection of toluene at low, trace levels is a laboratory artifact derived from the analytical methodology. The purge-and-trap analytical technique depends on the purging of the volatile organics in the water sample with helium gas onto a Tenax trapping column. The volatile materials are subsequently thermally desorbed, separated and quantified. Tenax, a toluene-like polymeric material, tends to decompose sporadically upon heating into toluene and other aromatic componenets (ethylbenzene and xylene) giving instrument blanks in the order of 0.05 ug/L.

The detected trace levels of Styrene are also considered to be laboratory artifacts due to the outgassing of monomeric styrene from the polystyrene shipping containers. The sporadic background levels from this source are in the order of 0.05 ug/L.

Ethylbenzene was detected at trace levels, five times in the treated water and twice in the Site 1 water.

Meta-Xylene (M-Xylene) was detected at a trace level, once in the treated water.

Ortho-Xylene (O-Xylene) was detected at a trace level, once in the treated water.

The volatiles listed above are typically found on an occasional basis at other water supplies included on the DWSP usually at trace levels.

1,2-Dichloroethane was detected at a trace level, once in the treated water.

Tetrachloroethylene (T-Chloroethylene) was detected at trace levels four times in the treated water.

Trihalomethanes (THMs) are known to be produced during the water treatment process and will always occur in chlorinated surface waters. THMs are comprised of Chloroform, Chlorodibromomethane and Dichlorobromomethane. Bromoform occurs occasionally. Results are reported for the individual compounds as well as for total THMs.

Chloroform, Chlorodibromomethane, Dichlorobromomethane and total THMs were always detected in all treated waters: the reason for unusually low THM levels in the April sample was not determined. All Total THM occurrences, ranging from 15.5 to 198.4 ug/L, were well below the ODWO of 350 ug/L.

CONCLUSIONS

The Cayuga Water Treatment Plant for the sample year of 1988 produced good quality water that was maintained in the distribution

system.

No health related guidelines, for organic or inorganic parameters were exceeded during 1988.

TABLE 3

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP SAMPLE DAY CONDITIONS FOR 1988

	SAMPLE DAY CONDITIONS		TREATMENT CHEMICAL DOSAGES (MG/L)			
			COAGULATION AID		COAGULATION	POST-CHLORINATION
DATE	RETENTION TIME(HRS)	FLOW (1000M3)	POLYELECTROLYTE	SODIUM SILICATE	POLYALUMINUM CHLORIDE	CHLORINE
JAN 06	2.0	.4	.	5.00	10.10	1.63
FEB 02	1.0	.6	.	5.00	23.00	1.23
MAR 08	1.0	.5	.	5.00	33.10	1.23
APR 06	1.2	.6	.	5.00	39.00	1.23
JUN 07	1.0	.9	.	.	15.60	2.04
JUL 05	1.0	.9	.	.	23.00	2.45
AUG 02	1.0	.7	.	.	39.10	2.45
SEP 07	1.0	.5	.	.	23.00	2.04
OCT 03	1.0	.6	.50	.	23.00	1.63
NOV 01	1.0	.6	.	.	18.40	1.23

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA

SUMMARY TABLE OF RESULTS (1988)

		RAW			TREATED			SITE 1		
SCAN	PARAMETER	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
BACTERIOLOGICAL	AEROMONAS SP	.	.	.	2	0	0	.	.	.
	E. COLI P/A	.	.	.	2	1	0	.	.	.
	FECAL COLIFORM MF	9	8	0	.	.	.	.	.	.
	FECAL COLIFORM	.	.	.	2	1	0	.	.	.
	STANDRD PLATE CNT MF	3	3	0	8	6	0	8	8	0
	P/A BOTTLE	.	.	.	7	2	0	6	0	0
	STAPH AUREUS	.	.	.	2	0	0	.	.	.
	COLIFORM	.	.	.	2	2	0	.	.	.
	TOTAL COLIFORM MF	8	8	0	10	1	0	9	1	0
	T COLIFORM BCKGRD MF	9	9	0	10	4	0	9	6	0
*TOTAL SCAN BACTERIOLOGICAL		29	28	0	45	17	0	32	15	0
*TOTAL GROUP BACTERIOLOGICAL		29	28	0	45	17	0	32	15	0
CHEMISTRY (FLD)	FLD CHLORINE (COMB)	.	.	.	10	10	0	.	.	.
	FLD CHLORINE FREE	.	.	.	10	10	0	.	.	.
	FLD CHLORINE (TOTAL)	.	.	.	10	10	0	.	.	.
	FLD PH	8	8	0	9	9	0	16	16	0
	FLD TEMPERATURE	10	10	0	10	10	0	14	14	0
	FLD TURBIDITY	10	10	0	10	10	0	3	3	0
*TOTAL SCAN CHEMISTRY (FLD)		28	28	0	59	59	0	33	33	0
CHEMISTRY (LAB)	ALKALINITY	11	11	0	10	10	0	16	16	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	RAW			TREATED			SITE 1		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
CHEMISTRY (LAB)	CALCIUM	11	11	0	10	10	0	16	16	0
	CYANIDE	11	1	0	10	1	0	9	0	0
	CHLORIDE	11	11	0	10	10	0	16	16	0
	COLOUR	11	11	0	10	10	0	16	16	0
	CONDUCTIVITY	11	11	0	10	10	0	16	16	0
	FLUORIDE	11	11	0	10	10	0	16	16	0
	HARDNESS	11	11	0	10	10	0	16	16	0
	IONCAL	11	4	0	11	4	0	16	6	0
	LANGELIERS INDEX	11	11	0	10	10	0	16	16	0
	MAGNESIUM	11	11	0	10	10	0	16	16	0
	SODIUM	11	11	0	10	10	0	16	16	0
	AMMONIUM TOTAL	11	9	2	10	8	1	16	14	2
	NITRITE	11	10	0	10	4	5	16	10	6
	TOTAL NITRATES	11	11	0	10	10	0	16	16	0
	NITROGEN TOT KJELD	11	11	0	10	10	0	16	16	0
	PH	11	11	0	10	10	0	16	16	0
	PHOSPHORUS FIL REACT	11	11	0	10	5	5	.	.	.
	PHOSPHORUS TOTAL	11	11	0	10	6	3	.	.	.
	TOTAL SOLIDS	1	1	0	1	1	0	1	1	0
	SULPHATE	4	4	0	4	4	0	6	6	0
	TURBIDITY	11	11	0	10	10	0	16	16	0
*TOTAL SCAN CHEMISTRY (LAB)		225	205	2	206	173	14	288	261	8
METALS	SILVER	9	0	5	10	0	7	16	0	11

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	RAW			TREATED			SITE 1		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
METALS	ALUMINUM	9	9	0	10	10	0	16	16	0
	ARSENIC	9	3	3	10	0	6	16	0	9
	BARIUM	9	9	0	10	10	0	16	16	0
	BORON	9	9	0	10	9	1	16	16	0
	BERYLLIUM	9	0	6	10	0	4	16	0	10
	CADMIUM	9	0	8	10	0	3	16	0	12
	COBALT	9	2	7	10	0	10	16	0	14
	CHROMIUM	9	7	2	10	4	6	16	8	8
	COPPER	9	9	0	10	10	0	16	16	0
	IRON	9	9	0	10	0	8	16	16	0
	MERCURY	11	5	4	10	2	1	9	6	2
	MANGANESE	9	9	0	10	10	0	16	16	0
	MOLYBDENUM	9	8	1	10	9	1	16	15	1
	NICKEL	9	8	1	10	7	3	16	12	4
	LEAD	9	9	0	10	7	3	16	16	0
	ANTIMONY	9	5	4	10	6	4	16	10	6
	SELENIUM	9	0	7	10	0	10	16	0	16
	STRONTIUM	9	9	0	10	10	0	16	16	0
	TITANIUM	9	9	0	10	10	0	16	16	0
	THALLIUM	9	0	4	10	0	4	16	0	5
	URANIUM	9	9	0	10	10	0	16	16	0
	VANADIUM	9	9	0	10	7	3	16	1	15
	ZINC	9	9	0	10	10	0	16	16	0
*TOTAL SCAN METALS		218	146	52	240	131	74	377	228	113
*TOTAL GROUP INORGANIC & PHYSICAL		471	379	54	505	363	88	698	522	121

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	RAW			TREATED			SITE 1		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
CHLOROAROMATICS	HEXACHLOROBUTADIENE	10	0	0	11	0	0	9	0	0
	123 TRICHLOROBENZENE	10	0	0	11	0	0	9	0	0
	1234 T-CHLOROBENZENE	10	0	0	11	0	0	9	0	0
	1235 T-CHLOROBENZENE	10	0	0	11	0	0	9	0	0
	124 TRICHLOROBENZENE	10	0	0	11	0	0	9	0	0
	1245 T-CHLOROBENZENE	10	0	0	11	0	0	9	0	0
	135 TRICHLOROBENZENE	10	0	0	11	0	0	9	0	0
	HCB	10	0	0	11	0	0	9	0	0
	HEXACHLOROETHANE	10	0	0	11	0	0	9	0	0
	OCTACHLOROSTYRENE	10	0	0	11	0	0	9	0	0
	PENTACHLOROBENZENE	10	0	0	11	0	0	9	0	0
	236 TRICHLOROTOLUENE	10	0	0	11	0	0	9	0	0
	245 TRICHLOROTOLUENE	10	0	0	11	0	0	9	0	0
	26A TRICHLOROTOLUENE	10	0	0	11	0	0	9	0	0
*TOTAL SCAN CHLOROAROMATICS		140	0	0	154	0	0	126	0	0
CHLOROPHENOLS	234 TRICHLOROPHENOL	2	0	0	2	0	0	.	.	.
	2345 T-CHLOROPHENOL	2	0	0	2	0	0	.	.	.
	2356 T-CHLOROPHENOL	2	0	0	2	0	0	.	.	.
	245-TRICHLOROPHENOL	2	0	0	2	0	1	.	.	.
	246-TRICHLOROPHENOL	2	0	0	2	0	0	.	.	.
	PENTACHLOROPHENOL	2	0	0	2	0	0	.	.	.
*TOTAL SCAN CHLOROPHENOLS		12	0	0	12	0	1	0	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA

SUMMARY TABLE OF RESULTS (1968)

SCAN	PARAMETER	RAW			TREATED			SITE 1		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
PAH	PHENANTHRENE	11	0	0	11	0	0	.	.	.
	ANTHRACENE	11	0	0	11	0	0	.	.	.
	FLUORANTHENE	11	1	0	11	0	0	.	.	.
	PYRENE	11	1	0	11	0	0	.	.	.
	BENZO(A)ANTHRACENE	11	1	0	11	0	0	.	.	.
	CHRYSENE	11	1	0	11	0	0	.	.	.
	DIMETH. BENZ(A)ANTHR	11	0	0	11	0	0	.	.	.
	BENZO(E) PYRENE	11	0	0	11	0	0	.	.	.
	BENZO(J) FLUORANTHEN	0	0	0	0	0	0	.	.	.
	BENZO(B) FLUORANTHEN	11	0	0	11	0	0	.	.	.
	PERYLENE	11	1	0	11	0	0	.	.	.
	BENZO(K) FLUORANTHEN	11	1	0	11	0	0	.	.	.
	BENZO(A) PYRENE	11	1	0	11	0	0	.	.	.
	BENZO(G,H,I) PERYLEN	11	1	0	11	0	0	.	.	.
	DIBENZO(A,H) ANTHRAC	11	1	0	11	0	0	.	.	.
	INDENO(1,2,3-C,D) PY	11	1	0	11	0	0	.	.	.
	BENZO(B) CHRYSENE	11	0	0	11	0	0	.	.	.
	ANTHANTHRENE	0	0	0	0	0	0	.	.	.
	CORONENE	11	0	0	11	0	0	.	.	.
*TOTAL SCAN PAH		187	10	0	187	0	0	0	0	0
PESTICIDES & PCB	ALDRIN	10	0	0	11	0	0	9	0	0
	ALPHA BHC	10	0	1	11	0	3	9	0	2

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	RAW			TREATED			SITE 1		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
PESTICIDES & PCB	BETA BHC	10	0	0	11	0	0	9	0	0
	LINDANE	10	0	4	11	0	10	9	0	6
	ALPHA CHLORDANE	10	0	0	11	0	0	9	0	0
	GAMMA CHLORDANE	10	0	0	11	0	0	9	0	0
	DIELDRIN	10	0	0	11	0	0	9	0	0
	METHOXYCHLOR	10	0	0	11	0	0	9	0	0
	ENDOSULFAN 1	10	0	0	11	0	0	9	0	0
	ENDOSULFAN II	10	0	0	11	0	0	9	0	0
	ENDRIN	10	0	0	11	0	0	9	0	0
	ENDOSULFAN SULPHATE	10	0	0	11	0	0	9	0	0
	HEPTACHLOR EPOXIDE	10	0	0	11	0	0	9	0	0
	HEPTACHLOR	10	0	0	11	0	0	9	0	0
	MIREX	10	0	0	11	0	0	9	0	0
	OXYCHLORDANE	10	0	0	11	0	0	9	0	0
	OPDDT	10	0	0	11	0	0	9	0	0
	PCB	10	0	0	11	0	0	9	0	0
	DDD	10	0	0	11	0	0	9	0	0
	PPDDE	10	0	0	11	0	0	9	0	0
	PPDDT	10	0	0	11	0	0	9	0	0
	AMETRINE	11	0	0	11	0	0	9	0	0
	ATRAZINE	10	1	4	11	1	4	9	0	4
	ATRATONE	11	0	0	11	0	0	9	0	0
	CYANAZINE	11	0	0	11	0	0	9	0	0
	DES ETHYL ATRAZINE	5	0	1	5	0	1	4	0	1
	DES ETHYL SIMAZINE	5	0	0	5	0	0	4	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	RAW			TREATED			SITE 1		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
PESTICIDES & PCB	PROMETONE	11	0	0	11	0	0	9	0	0
	PROPAZINE	11	0	0	11	0	0	9	0	0
	PROMETRYNE	11	0	0	11	0	0	9	0	0
	METRIBUZIN	11	0	0	11	0	0	9	0	0
	SIMAZINE	11	0	0	11	0	0	9	0	0
	ALACHLOR	11	0	0	11	0	0	9	0	0
	METOLACHLOR	11	0	0	11	0	0	9	0	0
*TOTAL SCAN PESTICIDES & PCB		340	1	10	362	1	18	296	0	13
PHENOLICS	PHENOLICS	10	4	4	10	6	1	.	.	.
*TOTAL SCAN PHENOLICS		10	4	4	10	6	1	0	0	0
SPECIFIC PESTICIDES	TOXAPHENE	0	0	0	0	0	0	0	0	0
	2,4,5-T	2	0	0	2	0	0	.	.	.
	2,4-D	2	0	0	2	0	0	.	.	.
	2,4-DB	2	0	0	2	0	0	.	.	.
	2,4 D PROPIONIC ACID	2	0	0	2	0	0	.	.	.
	DICAMBA	2	0	0	2	0	0	.	.	.
	PICHLORAM	0	0	0	0	0	0	.	.	.
	SILVEX	2	0	0	2	0	0	.	.	.
	DIAZINON	2	0	0	2	0	0	.	.	.

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	RAW			TREATED			SITE 1		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
SPECIFIC PESTICIDES	DICHLOROVOS	2	0	0	2	0	0	.	.	.
	CHLORPYRIFOS	2	0	0	2	0	0	.	.	.
	ETHION	2	0	0	2	0	0	.	.	.
	AZINPHOS-METHYL	0	0	0	0	0	0	.	.	.
	MALATHION	2	0	0	2	0	0	.	.	.
	MEVINPHOS	2	0	0	2	0	0	.	.	.
	METHYL PARATHION	2	0	0	2	0	0	.	.	.
	METHYLTRITHION	2	0	0	2	0	0	.	.	.
	PARATHION	2	0	0	2	0	0	.	.	.
	PHORATE	2	0	0	2	0	0	.	.	.
	RELDAN	2	0	0	2	0	0	.	.	.
	RONNEL	2	0	0	2	0	0	.	.	.
	AMINOCARB	0	0	0	0	0	0	.	.	.
	BENOMYL	2	0	0	2	0	0	.	.	.
	BUX	2	0	0	2	0	0	.	.	.
	CARBOFURAN	2	0	0	2	0	0	.	.	.
	CICP	2	0	0	2	0	0	.	.	.
	DIALLATE	2	0	0	2	0	0	.	.	.
	EPTAM	2	0	0	2	0	0	.	.	.
	IPC	2	0	0	2	0	0	.	.	.
	PROPOXUR	2	0	0	2	0	0	.	.	.
	CARBARYL	2	0	0	2	0	0	.	.	.
	BUTYLATE	2	0	0	2	0	0	.	.	.
*TOTAL SCAN SPECIFIC PESTICIDES		56	0	0	56	0	0	0	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	RAW			TREATED			SITE 1		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
VOLATILES	BENZENE	8	0	0	7	0	0	6	0	4
	TOLUENE	8	0	0	7	0	2	6	0	0
	ETHYLBENZENE	8	0	0	7	0	5	6	0	2
	P-XYLENE	8	0	0	7	0	0	6	0	0
	M-XYLENE	8	0	0	7	0	1	6	0	0
	O-XYLENE	8	0	0	7	0	1	6	0	0
	STYRENE	2	0	1	2	0	1	2	1	1
	1,1 DICHLOROETHYLENE	8	0	0	7	0	0	6	0	0
	METHYLENE CHLORIDE	8	0	0	7	0	0	6	0	0
	T1,2DICHLOROETHYLENE	8	0	0	7	0	0	6	0	0
	1,1 DICHLOROETHANE	8	0	0	7	0	0	6	0	0
	CHLOROFORM	8	1	5	7	7	0	6	6	0
	111, TRICHLOROETHANE	8	0	0	7	0	0	6	0	0
	1,2 DICHLOROETHANE	8	0	0	7	0	1	6	0	0
	CARBON TETRACHLORIDE	8	0	0	7	0	0	6	0	0
	1,2 DICHLOROPROPANE	8	0	0	7	0	0	6	0	0
	TRICHLOROETHYLENE	8	0	0	7	0	0	6	0	0
	DICHLOROBROMOMETHANE	8	0	1	7	7	0	6	6	0
	112 TRICHLOROETHANE	8	0	0	7	0	0	6	0	0
	CHLORODIBROMOMETHANE	8	0	0	7	6	1	6	5	1
	T-CHLOROETHYLENE	8	0	0	7	0	4	6	0	0
	BROMOFORM	8	0	0	7	0	1	6	0	1
	1122 T-CHLOROETHANE	8	0	0	7	0	0	6	0	0
	CHLOROBENZENE	8	0	0	7	0	0	6	0	0
	1,4 DICHLOROBENZENE	8	0	0	7	0	0	6	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA

SUMMARY TABLE OF RESULTS (1988)

SCAN	PARAMETER	RAW			TREATED			SITE 1		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
VOLATILES	1,3 DICHLOROBENZENE	8	0	0	7	0	0	6	0	0
	1,2 DICHLOROBENZENE	8	0	0	7	0	0	6	0	0
	TRIFLUOROCHLOROTOLUE	3	0	0	2	0	0	2	0	0
	ETHLYENE DIBROMIDE	8	0	0	7	0	0	6	0	0
	TOTL TRIHALOMETHANES	8	0	1	7	7	0	6	6	0
*TOTAL SCAN VOLATILES		229	1	8	200	27	17	172	24	9
*TOTAL GROUP ORGANIC		974	16	22	981	34	37	594	24	22
TOTAL		1474	423	76	1531	414	125	1324	561	143

KEY TO TABLE 5 and 6

A ONTARIO DRINKING WATER OBJECTIVES (ODWO)

1. Maximum Acceptable Concentration (MAC)

1+. MAC for Total Trihalomethanes

1*. MAC for Bacteriological Analyses
Poor water quality is indicated when :
- total coliform counts > 0 < 5
- P/A Bottle Test is present after 48 hours
- Aeromonas organisms are detected in more than 25% of samples in a single submission or in successive submissions from the same sampling site
- Pseudomonas Aeruginosa, Staphylococcus Aureus and members of the Fecal Streptococcus group should not be detected in any sample
- Standard Plate Count should not exceed 500 organisms per ml at 35 ^{0}C within 48 hours

2. Interim Maximum Acceptable Concentration (IMAC)
3. Maximum Desirable Concentration (MDC)
4. Aesthetic or Recommended Operational Guideline
- hardness levels between 80 and 100 mg/L as calcium carbonate are considered to provide an acceptable balance between corrosion and incrustation, water supplies with a hardness >200 mg/L are considered poor and those in excess of 500 mg/L are unacceptable.

B HEALTH & WELFARE CANADA (H&W)
1. Maximum Acceptable Concentration (MAC)
2. Proposed MAC
3. Interim MAC
4. Aesthetic Objective (AO) (for xylenes, the AO is a total)

C WORLD HEALTH ORGANIZATION (WHO)
1. Guideline Value (GV)
2. Tentative GV
3. Aesthetic GV

D US ENVIRONMENTAL PROTECTION AGENCY (EPA)
1. Maximum Contaminant Level (MCL)
2. Suggested No-Adverse Effect Level (SNAEL)
3. Lifetime Health Advisory
4. EPA Ambient Water Quality Criteria

F EUROPEAN ECONOMIC COMMUNITY (EEC)
1. Health Related Guideline Level
2. Aesthetic Guideline Level
3. Maximum Admissable Concentration (MADC)

G CALIFORNIA STATE DEPARTMENT OF HEALTH-GUIDELINE VALUE

H USSR MAXIMUM PERMISSIBLE CONCENTRATION

I NEW YORK STATE AMBIENT WATER GUIDELINE

N/A NONE AVAILABLE

LABORATORY RESULTS, REMARK DESCRIPTIONS

.	No Sample Taken
BDL	Below Minimum Measurable Amount
<T	Greater Than Detection Limit But Not Confident
>	Results Are Greater Than The Upper Limit
<=>	Approximate Result
!AW	No Data: Analysis Withdrawn
!CR	No Data: Could Not Confirm By Reanalysis
!CS	No Data: Contamination Suspected
!IL	No Data: Sample Incorrectly Labelled
!IS	No Data: Insufficient Sample
!LA	No Data: Laboratory Accident
!LD	No Data: Test Queued After Sample Discarded
!NA	No Data: No Authorization To Perform Reanalysis
!NP	No Data: No Procedure
!NR	No Data: Sample Not Received
!OP	No Data: Obscured Plate
!QU	No Data: Quality Control Unacceptable
!PE	No Data: Procedural Error - Sample Discarded
!PH	No Data: Sample pH Outside Valid Range
!RO	No Data: See Attached Report (no numeric results)
!SM	No Data: Sample Missing
!SS	No Data: Send Separate Sample Properly Preserved
!UI	No Data: Indeterminant Interference
!TX	No Data: Time Expired
A3C	Approximate, Total Count Exceeded 300 Colonies
APL	Additional Peak, Large, Not Priority Pollutant
APS	Additional Peak, Less Than, Not Priority Pollutant
CIC	Possible Contamination, Improper Cap
CRO	Calculated Result Only

PPS	Test Performed On Preserved Sample
RMP	P and M-Xylene Not Separated
RRV	Rerun Verification
RVU	Reported Value Unusual
SPS	Several Peaks, Small, Not Priority Pollutant
UAL	Unreliable: Sample Age Exceeds Normal Limit
UCR	Unreliable: Could Not Confirm By Reanalysis
UCS	Unreliable: Contamination Suspected
UIN	Unreliable: Indeterminant Interference
XP	Positive After X Number of Hours
T# (T06)	Result Taken After # Hours

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
BACTERIOLOGICAL				
AEROMONAS SP ( )		DET'N LIMIT = N/A		GUIDELINE = 0 (A1)
JAN	.	0	.	.
FEB	.	0	.	.
E. COLI P/A ( )		DET'N LIMIT = N/A		GUIDELINE = N/A
JAN	.	1	.	.
FEB	.	0	.	.
FECAL COLIFORM MF (CT/100ML)		DET'N LIMIT = 0		GUIDELINE = 0 (A1)
JAN	19	.	.	.
FEB	33	.	.	.
MAR	5	.	.	.
APR	216	.	.	.
JUN	9	.	.	.
AUG	28	.	.	.
SEP	38	.	.	.
OCT	121 T48	.	.	.
	BDL	.	.	.
FECAL COLIFORM ( )		DET'N LIMIT = N/A		GUIDELINE = 0 (A1)
JAN	.	1	.	.
FEB	.	0	.	.
STANDRD PLATE CNT MF (CT/ML)		DET'N LIMIT = 0		GUIDELINE = 500/ML (A1)
JAN	2400 >	39	.	77
FEB	TOP	TLA	.	TLA
MAR	1200	87	.	470
APR	TOP	5	.	280
JUN	740	165	.	43
JUL	.	500	.	2400 >
AUG	TAV	TAV	.	.
SEP	.	5	.	1100
OCT	.	2 <=>	.	200 T24
	.	8 <=>	.	.
NOV	.	.	.	210 T24
P/A BOTTLE ( )		DET'N LIMIT = 0		GUIDELINE = 0 (A1*)
JAN	.	1	.	0
FEB	.	1	.	0

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
MAR	.	0	.	0
APR	.	0	.	0
JUN	.	0	.	0
JUL	.	0	.	0
AUG	.	0	.	.
STAPH AUREUS ( )		DET'N LIMIT = N/A		GUIDELINE = 0 (A1)
JAN	.	0	.	.
FEB	.	0	.	.
COLIFORM ( )		DET'N LIMIT = N/A		GUIDELINE = 0 (A1)
JAN	.	1	.	.
FEB	.	1	.	.
TOTAL COLIFORM MF (CT/100ML)		DET'N LIMIT = 0		GUIDELINE = 5/100ML(A1)
JAN	2300	0	.	0
FEB	14200 A3C	0	.	0
MAR	3600	0	.	0
APR	10800	0	.	0
JUN	TOP	0	.	0
JUL	.	0	.	1
AUG	1700 A3C	0	.	.
SEP	1700 A3C	0	.	0
OCT	2000 A3C	3 T48	.	0 T24
	233 A3C	0 T48	.	.
NOV	.	.	.	0 T24
T COLIFORM BCKGRD MF (CT/100ML)		DET'N LIMIT = 0		GUIDELINE = N/A
JAN	7700	0	.	0
FEB	30000	0	.	10
MAR	9700	65	.	0
APR	23600	0	.	0
JUN	44000	0	.	420
JUL	.	0	.	64
AUG	76000	0	.	.
SEP	40000	1	.	730
OCT	51000 A3C	1 T48	.	28 T24
	32167 A3C	1 T48	.	.
NOV	.	.	.	2 T24

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
CHEMISTRY (FLD)				
FLD CHLORINE (COMB) ( )		DET'N LIMIT = N/A		GUIDELINE = N/A
JAN	.	.400	.	.
FEB	.	2.000	.	.
MAR	.	2.000	.	.
APR	.	.250	.	.
JUN	.	.400	.	.
JUL	.	.600	.	.
AUG	.	.600	.	.
SEP	.	.200	.	.
OCT	.	.600	.	.
	.	.600	.	.
FLD CHLORINE FREE ( )		DET'N LIMIT = N/A		GUIDELINE = N/A
JAN	.	1.100	.	.
FEB	.	.750	.	.
MAR	.	.500	.	.
APR	.	.500	.	.
JUN	.	1.500	.	.
JUL	.	1.400	.	.
AUG	.	1.400	.	.
SEP	.	1.800	.	.
OCT	.	1.400	.	.
	.	1.400	.	.
FLD CHLORINE (TOTAL) ( )		DET'N LIMIT = N/A		GUIDELINE = N/A
JAN	.	1.500	.	.
FEB	.	2.750	.	.
MAR	.	2.500	.	.
APR	.	.750	.	.
JUN	.	1.900	.	.
JUL	.	2.000	.	.
AUG	.	2.000	.	.
SEP	.	2.000	.	.
OCT	.	2.000	.	.
	.	2.000	.	.
FLD PH (DIMNSLESS)		DET'N LIMIT = N/A		GUIDELINE = 6.5-8.5(A4)
JAN	8.000	7.800	.	7.600
FEB	8.000	7.800	7.600	7.600
MAR	7.800	8.000	7.600	7.600
APR	.	.	.	7.400

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
JUN	.	8.000	7.800	7.400
JUL	7.600	7.800	7.600	7.600
AUG	7.600	7.600	.	.
SEP	7.800	7.800	7.800	7.600
OCT	7.800	8.000	7.600	7.600
	7.400	7.600	.	.
NOV	.	.	7.800	7.800
FLD TEMPERATURE (DEG.C)			DET'N LIMIT = N/A	GUIDELINE = 15 (A1)
JAN	.500	1.000	.	8.000
FEB	.200	.200	15.000	11.000
MAR	.500	.500	18.000	5.000
APR	7.000	8.000	.	11.000
JUN	20.000	20.000	22.000	14.000
JUL	22.000	21.500	21.000	18.000
AUG	24.000	24.000	.	.
SEP	18.000	18.000	2[illegible].000	21.000
OCT	16.000	16.500	.	.
	6.000	6.000	.	.
NOV	.	.	2.300	1.700
FLD TURBIDITY (FTU)			DET'N LIMIT = N/A	GUIDELINE = 1.0 (A1)
JAN	3.800	.300	.	.700
FEB	2.700	.600	1.700	1.700
MAR	12.000	.500	.	.
APR	92.000	.400	.	.
JUN	10.000	.910	.	.
JUL	20.000	.400	.	.
AUG	50.000	.300	.	.
SEP	26.000	.200	.	.
OCT	12.000	.400	.	.
	8.000	.200	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
	CHEMISTRY (LAB)			
ALKALINITY (MG/L)			DET'N LIMIT = .200	GUIDELINE = 30-500 (A4)
JAN	258.400	251.100	.	226.300
FEB	198.400	187.300	202.600	202.900
MAR	210.600	199.100	218.600	216.300
APR	188.100	176.800	.	169.200
MAY	188.900	.	.	.
JUN	197.800	197.300	195.600	192.900
JUL	166.800	159.100	167.700	158.400
AUG	163.500	146.700	.	.
SEP	168.800	161.000	173.500	164.100
OCT	183.500	178.100	179.500	177.700
	225.400	218.100	.	.
NOV	.	.	205.100	204.400
CALCIUM (MG/L)			DET'N LIMIT = .100	GUIDELINE = 100 (F2)
JAN	104.000	101.000	.	92.800
FEB	81.400	82.400	82.400	83.200
MAR	94.000	92.400	94.600	98.000
APR	75.000	71.200	.	68.600
MAY	77.200	.	.	.
JUN	81.200	81.600	81.400	79.800
JUL	75.200	76.800	76.000	77.000
AUG	70.100	66.800	.	.
SEP	80.400	80.200	79.400	81.000
OCT	86.400	85.800	84.400	86.800
	88.600	87.400	.	.
NOV	.	.	90.800	87.000
CYANIDE (MG/L)			DET'N LIMIT = 0.001	GUIDELINE = .200 (A1)
JAN	BDL	BDL	.	BDL
FEB	.007	.011	.	BDL
MAR	BDL	BDL	.	BDL
APR	BDL	BDL	.	BDL
MAY	BDL	.	.	.
JUN	BDL	BDL	.	BDL
JUL	BDL	BDL	.	BDL
AUG	BDL	BDL	.	.
SEP	BDL	BDL	.	BDL
OCT	BDL	BDL	.	BDL
	BDL	BDL	.	.
NOV	.	.	.	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
CHLORIDE (MG/L)			DET'N LIMIT = .200	GUIDELINE = 250 (A3)
JAN	42.400	51.500	.	46.500
FEB	56.100	65.100	79.000	78.600
MAR	69.800	78.100	79.200	78.800
APR	32.400	45.500	.	37.900
MAY	51.600	.	.	.
JUN	67.100	74.300	74.600	73.400
JUL	80.900	91.400	91.900	91.100
AUG	62.200	75.600	.	.
SEP	80.100	90.600	99.500	84.600
OCT	73.400	81.000	83.700	84.700
	60.100	68.500	.	.
NOV	.	.	72.800	72.700
COLOUR (HZU)			DET'N LIMIT = .5	GUIDELINE = 5.0 (A3)
JAN	20.500	8.000	.	8.000
FEB	26.000	7.500	13.500	13.500
MAR	18.000	4.500	8.500	9.000
APR	20.500	5.000	.	8.000
MAY	14.500	.	.	.
JUN	19.000	6.500	7.500	8.000
JUL	15.000	4.500	7.500	7.000
AUG	15.500	3.500	.	.
SEP	12.000	2.500	4.500	5.500
OCT	13.000	2.500	6.000	6.000
	16.500	4.000	.	.
NOV	.	.	6.000	6.000
CONDUCTIVITY (UMHO/CM)			DET'N LIMIT = 1	GUIDELINE = 400 (F2)
JAN	771	795	.	712
FEB	714	732	802	806
MAR	791	801	829	823
APR	489	551	.	525
MAY	689	.	.	.
JUN	796	831	815	810
JUL	830	852	832	844
AUG	684	711	.	.
SEP	811	837	884	821
OCT	819	842	846	839
	806	824	.	.
NOV	.	.	835	832
FLUORIDE (MG/L)			DET'N LIMIT = .01	GUIDELINE = 2.400 (A1)

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
JAN	.100	.120	.	.100
FEB	.160	.100	.120	.120
MAR	.140	.110	.120	.120
APR	.100	.070	.	.090
MAY	.140	.	.	.
JUN	.190	.170	.190	.190
JUL	.230	.200	.210	.200
AUG	.170	.130	.	.
SEP	.180	.160	.180	.180
OCT	.200	.160	.180	.180
	.160	.100	.	.
NOV	.	.	.100	.120

HARDNESS (MG/L) DET'N LIMIT = .500 GUIDELINE = 80-100 (A4)

JAN	368.000	357.000	.	329.000
FEB	287.000	289.000	291.000	291.000
MAR	325.000	320.000	330.000	340.000
APR	257.000	247.000	.	236.000
MAY	284.000	.	.	.
JUN	304.000	308.000	305.000	299.000
JUL	293.000	297.000	295.000	297.000
AUG	255.200	249.400	.	.
SEP	301.000	300.000	297.000	300.000
OCT	322.000	318.000	315.000	321.000
	325.000	320.000	.	.
NOV	.	.	331.000	322.000

IONCAL (DIMNSLESS) DET'N LIMIT = N/A GUIDELINE = N/A

JAN	.000 NAF	.000 NAF	.	.000 NAF
FEB	.000 NAF	.000 NAF	.000 NAF	.000 NAF
MAR	.000 NAF	.000 NAF	.000 NAF	.000 NAF
APR	.000 NAF	.000 NAF	.	.000 NAF
MAY	.000 NAF	.000 NAF	.	.
JUN	.000 NAF	.000 NAF	.000 NAF	.000 NAF
JUL	.000 NAF	.000 NAF	.000 NAF	.000 NAF
AUG	1.226	3.772	.	.
SEP	2.732	3.075	1.995	.295
OCT	.188	.090	.054	1.492
	4.330	7.044	.	.
NOV	.	.	3.793	2.533

LANGELIERS INDEX (DIMNSLESS) DET'N LIMIT = N/A GUIDELINE = N/A

JAN	1.300 NAF	1.343 NAF	.	1.175 NAF

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
FEB	.991 NAF	.921 NAF	1.021 NAF	.996 NAF
MAR	1.066 NAF	.954 NAF	1.123 NAF	1.084 NAF
APR	.980 NAF	.954 NAF	.	.891 NAF
MAY	.868 NAF	.	.	.
JUN	1.245 NAF	1.184 NAF	1.230 NAF	1.136 NAF
JUL	.526 NAF	.943 NAF	.713 NAF	.963 NAF
AUG	.714	.664	.	.
SEP	1.121	1.088	1.154	1.131
OCT	1.178	1.141	1.157	1.195
	1.239	1.208	.	.
NOV	.	.	1.147	1.167
MAGNESIUM (MG/L)		DET'N LIMIT = .050		GUIDELINE = 30 (F2)
JAN	26.000	25.700	.	23.600
FEB	20.300	20.300	20.700	20.300
MAR	22.100	21.700	22.900	23.200
APR	16.900	16.800	.	15.800
MAY	22.200	.	.	.
JUN	24.700	25.300	24.800	24.400
JUL	25.500	25.600	25.600	25.600
AUG	19.500	20.100	.	.
SEP	24.300	24.200	24.100	23.600
OCT	25.800	25.200	25.400	25.200
	25.300	24.900	.	.
NOV	.	.	25.300	25.500
SODIUM (MG/L)		DET'N LIMIT = .200		GUIDELINE = 200 (C3)
JAN	23.600	27.600	.	23.600
FEB	34.400	36.000	48.400	47.600
MAR	43.800	44.800	47.800	47.400
APR	17.800	19.600	.	18.000
MAY	30.800	.	.	.
JUN	42.800	46.000	45.800	45.000
JUL	51.800	55.000	56.400	56.000
AUG	40.400	42.400	.	.
SEP	53.200	56.000	67.400	52.400
OCT	48.800	51.000	52.600	52.800
	38.000	38.400	.	.
NOV	.	.	44.800	43.800
AMMONIUM TOTAL (MG/L)		DET'N LIMIT = 0.002		GUIDELINE = .05 (F2)
JAN	.396	.020	.	.010

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DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
FEB	.302	.480	.484	.482
MAR	.138	.484	.108	.134
APR	.006 <T	.082	.	.006 <T
MAY	.016	.	.	.
JUN	.082	.020	.022	.018
JUL	.014	.016	.028	.020
AUG	.006 <T	.008 <T	.	.
SEP	.024	BDL	.040	.026
OCT	.050	.010	.008 <T	.010
	.042	.018	.	.
NOV	.	.	.018	.014
NITRITE (MG/L)		DET'N LIMIT = 0.001		GUIDELINE = 1.000 (A1)
JAN	.107	.001 <T	.	.002 <T
FEB	.017	.011	.006	.007
MAR	.015	.005	.010	.127
APR	.007	.006	.	.006
MAY	.050	.	.	.
JUN	.026	.001 <T	.002 <T	.002 <T
JUL	.009	.002 <T	.003 <T	.004 <T
AUG	BDL	BDL	.	.
SEP	.087	.001 <T	.083	.098
OCT	.019	.003 <T	.003 <T	.013
	.045	.009	.	.
NOV	.	.	.011	.007
TOTAL NITRATES (MG/L)		DET'N LIMIT = .020		GUIDELINE = 10.000 (A1)
JAN	4.660	4.670	.	4.510
FEB	3.360	3.140	3.330	3.170
MAR	3.800	3.240	3.730	3.640
APR	4.010	3.690	.	3.100
MAY	2.370	.	.	.
JUN	1.270	1.310	1.610	1.480
JUL	1.110	1.030	1.210	1.030
AUG	1.820	1.540	.	.
SEP	2.000	1.830	1.220	1.150
OCT	1.530	1.570	1.620	1.570
	3.460	3.460	.	.
NOV	.	.	3.000	2.980
NITROGEN TOT KJELD (MG/L)		DET'N LIMIT = .020		GUIDELINE = N/A
JAN	.890	.500	.	.430

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DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
FEB	1.380	.960	.970	1.050
MAR	1.700	1.490	1.550	1.430
APR	1.230	.540	.	.420
MAY	.690	.	.	.
JUN	.875	.620	.490	.540
JUL	.870	.600	.490	.460
AUG	.350	.370	.	.
SEP	.925	.400	.420	.360
OCT	.620	.310	.320	.300
	.640	.470	.	.
NOV	.	.	.380	.380
PH (DIMNSLESS)		DET'N LIMIT = N/A		GUIDELINE = 6.5-8.5(A4)
JAN	8.350	8.420	.	8.330
FEB	8.260	8.210	8.280	8.250
MAR	8.250	8.170	8.290	8.240
APR	8.290	8.320	.	8.290
MAY	8.180	.	.	.
JUN	8.520	8.460	8.510	8.430
JUL	7.910	8.340	8.090	8.360
AUG	8.130	8.150	.	.
SEP	8.470	8.460	8.500	8.490
OCT	8.460	8.440	8.460	8.490
	8.420	8.410	.	.
NOV	.	.	8.360	8.400
PHOSPHORUS FIL REACT (MG/L)		DET'N LIMIT = .0005		GUIDELINE = N/A
JAN	.040	.005	.	.
FEB	.079	.008	.	.
MAR	.052	.003	.	.
APR	.097	.002 <T	.	.
MAY	.019	.	.	.
JUN	.016	.002	.	.
JUL	.012	.000 <T	.	.
AUG	.050	.001 <T	.	.
SEP	.013	.000 <T	.	.
OCT	.004	.002 <T	.	.
	.002	.001	.	.
PHOSPHORUS TOTAL (MG/L)		DET'N LIMIT = .002		GUIDELINE = .40 (F2)
JAN	.051	.011	.	.
FEB	.138	.014	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
MAR	.170	.138	.	.
APR	.405	.008	.	.
MAY	.067	.	.	.
JUN	.065	.098	.	.
JUL	.072	.013	.	.
AUG	.059	.008 <T	.	.
SEP	.070	BDL	.	.
OCT	.038	.005 <T	.	.
	.029	.005 <T	.	.
TOTAL SOLIDS (MG/L)		DET'N LIMIT = 1.		GUIDELINE = 500 (A3)
JAN	501 CRO	517 CRO	.	463 CRO
SULPHATE ( )		DET'N LIMIT = .200		GUIDELINE = 500. (A3)
AUG	86.050	91.960	.	.
SEP	111.800	109.100	112.500	119.600
OCT	131.000	126.000	121.000	121.000
	99.100	101.400	.	.
NOV	.	.	121.000	106.000
TURBIDITY (FTU)		DET'N LIMIT = .02		GUIDELINE = 1.00 (A1)
JAN	4.500	.540	.	.410
FEB	33.000	.360	1.860	1.170
MAR	14.500	.120	.790	.410
APR	180.000	.220	.	.520
MAY	10.600	.	.	.
JUN	5.500	1.470	1.070	.930
JUL	20.000	.580	.810	.440
AUG	50.000	.540	.	.
SEP	31.000	.430	.900	.880
OCT	9.500	1.160	1.100	1.280
	7.200	.490	.	.
NOV	.	.	.840	.780

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
METALS				
SILVER (UG/L)		DET'N LIMIT = .020		GUIDELINE = 50. (A1)
JAN	.030 <T	.130 <T	.	.040 <T
FEB	.090 <T	.080 <T	.040 <T	.030 <T
MAR	.020 <T	.020 <T	.020 <T	.050 <T
APR	BDL	BDL	.	BDL
MAY	ISM	.	.	.
JUN	BDL	BDL	BDL	BDL
JUL	ISM	.230 <T	.100 <T	.050 <T
AUG	BDL	BDL	.	.
SEP	BDL	.110 <T	.110 <T	.050 <T
OCT	.060 <T	.040 <T	.040 <T	BDL
	.040 <T	.040 <T	.	.
NOV	.	.	.030 <T	BDL
ALUMINUM (UG/L)		DET'N LIMIT = .050		GUIDELINE = 100.(A4)
JAN	139.200	113.680	.	33.640
FEB	568.400	139.200	255.200	243.600
MAR	255.200	85.840	63.800	38.280
APR	1160.000	64.960	.	39.440
MAY	ISM	.	.	.
JUN	127.600	498.800	174.000	174.000
JUL	ISM	278.400	139.200	98.600
AUG	696.000	127.600	.	.
SEP	452.400	162.400	63.800	60.320
OCT	220.400	197.200	78.880	69.600
	220.400	185.600	.	.
NOV	.	.	69.600	55.680
ARSENIC (UG/L)		DET'N LIMIT = 0.050		GUIDELINE = 50.0 (A1)
JAN	.840 <T	.840 <T	.	.560 <T
FEB	.820 <T	.550 <T	.760 <T	.700 <T
MAR	BDL	BDL	BDL	BDL
APR	BDL	BDL	.	BDL
MAY	ISM	.	.	.
JUN	1.100	.690 <T	.100 <T	.300 <T
JUL	ISM	BDL	BDL	BDL
AUG	1.500	.640 <T	.	.
SEP	.820 <T	.430 <T	.430 <T	.220 <T
OCT	1.700	.660 <T	.500 <T	.600 <T
	BDL	BDL	.	.
NOV	.	.	BDL	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
BARIUM (UG/L)		DET'N LIMIT = 0.020		GUIDELINE = 1000. (A1)
JAN	34.000	30.000	.	26.000
FEB	35.000	27.000	32.000	29.000
MAR	37.000	29.000	32.000	24.000
APR	41.000	22.000	.	20.000
MAY	ISH	.	.	.
JUN	42.000	39.000	38.000	34.000
JUL	ISH	41.000	45.000	41.000
AUG	44.000	34.000	.	.
SEP	44.000	36.000	37.000	38.000
OCT	40.000	35.000	37.000	32.000
	44.000	36.000	.	.
NOV	.	.	37.000	34.000
BORON (UG/L)		DET'N LIMIT = 0.200		GUIDELINE = 5000. (A1)
JAN	27.000	30.000	.	27.000
FEB	40.000	41.000	44.000	45.000
MAR	53.000	48.000	53.000	43.000
APR	22.000	17.000 <T	.	23.000
MAY	ISH	.	.	.
JUN	66.000	71.000	69.000	65.000
JUL	ISH	84.000	85.000	79.000
AUG	50.000	85.000	.	.
SEP	68.000	120.000	140.000	130.000
OCT	110.000	75.000	110.000	71.000
	150.000	160.000	.	.
NOV	.	.	100.000	98.000
BERYLLIUM (UG/L)		DET'N LIMIT = 0.010		GUIDELINE = .20 (N)
JAN	BDL	BDL	.	.010 <T
FEB	.100 <T	.050 <T	.070 <T	.060 <T
MAR	BDL	BDL	.010 <T	.010 <T
APR	.120 <T	BDL	.	BDL
MAY	ISH	.	.	.
JUN	BDL	BDL	BDL	BDL
JUL	ISH	BDL	BDL	BDL
AUG	.060 <T	.040 <T	.	.
SEP	.070 <T	.150 <T	.150 <T	.080 <T
OCT	.080 <T	BDL	.090 <T	BDL
	.170 <T	.130 <T	.	.
NOV	.	.	.150 <T	.110 <T
CADMIUM (UG/L)		DET'N LIMIT = 0.050		GUIDELINE = 5.000 (A1)

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
JAN	.060 <T	BDL	.	.050 <T
FEB	.110 <T	.070 <T	.150 <T	.060 <T
MAR	BDL	BDL	.120 <T	.050 <T
APR	.190 <T	BDL	.	BDL
MAY	ISM	.	.	.
JUN	.080 <T	BDL	.200 <T	.110 <T
JUL	ISM	.070 <T	.130 <T	.060 <T
AUG	.110 <T	BDL	.	.
SEP	.060 <T	BDL	.070 <T	BDL
OCT	.160 <T	BDL	.080 <T	BDL
	.140 <T	.210 <T	.	.
NOV	.	.	.070 <T	BDL

COBALT (UG/L) DET'N LIMIT = 0.020 GUIDELINE = 1000 (N)

JAN	.140 <T	.080 <T	.	.030 <T
FEB	.430 <T	.100 <T	.090 <T	.050 <T
MAR	.260 <T	.120 <T	.030 <T	.040 <T
APR	2.100	.750 <T	.	.670 <T
MAY	ISM	.	.	.
JUN	.430 <T	.270 <T	.230 <T	.280 <T
JUL	ISM	.430 <T	.340 <T	.380 <T
AUG	1.100	.210 <T	.	.
SEP	.640 <T	.230 <T	.210 <T	.140 <T
OCT	.640 <T	.360 <T	.170 <T	.250 <T
	.080 <T	.160 <T	.	.
NOV	.	.	BDL	BDL

CHROMIUM (UG/L) DET'N LIMIT = 0.100 GUIDELINE = 50. (A1)

JAN	.420 <T	.340 <T	.	.760 <T
FEB	1.500	.570 <T	1.100	.670 <T
MAR	2.200	.460 <T	2.000	.730 <T
APR	3.200	.260 <T	.	.620 <T
MAY	ISM	.	.	.
JUN	.760 <T	.270 <T	.700 <T	.770 <T
JUL	ISM	.220 <T	.410 <T	.390 <T
AUG	2.000	3.900	.	.
SEP	1.100	4.700	5.800	4.800
OCT	9.500	2.700	11.000	1.200
	17.000	17.000	.	.
NOV	.	.	6.800	6.100

COPPER (UG/L) DET'N LIMIT = .100 GUIDELINE = 1000 (A3)

JAN	2.200	1.500	.	37.000

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
FEB	4.600	2.900	390.000	38.000
MAR	3.700	1.900	630.000	26.000
APR	8.500	1.500	.	18.000
MAY	ISM	.	.	.
JUN	5.100	2.400	130.000	23.000
JUL	ISM	2.500	170.000	25.000
AUG	11.000	2.300	.	.
SEP	6.900	2.400	380.000	46.000
OCT	4.600	1.900	140.000	17.000
	3.700	2.000	.	.
NOV	.	.	300.000	31.000
IRON (UG/L)		DET'N LIMIT = 4.000		GUIDELINE = 300. (A3)
FEB	670.000	33.000 <T	190.000	180.000
MAR	320.000	8.700 <T	110.000	55.000
APR	1500.000	9.500 <T	.	73.000
MAY	ISM	.	.	.
JUN	170.000	18.000 <T	55.000	66.000
JUL	ISM	13.000 <T	140.000	110.000
AUG	1300.000	7.200 <T	.	.
SEP	710.000	5.700 <T	110.000	120.000
OCT	260.000	BDL	110.000	120.000
	190.000	BDL	.	.
NOV	.	.	74.000	79.000
JAN	150.000	13.000 <T	.	67.000
MERCURY (UG/L)		DET'N LIMIT = 0.010		GUIDELINE = 1.000 (A1)
JAN	.010	BDL	.	BDL
FEB	.020	.010	.	.010
MAR	.010	.010	.	.010
APR	.060	BDL	.	.010
MAY	.080	.	.	.
JUN	BDL	BDL	.	.030 <T
JUL	BDL	BDL	.	.030 <T
AUG	.020 <T	BDL	.	.
SEP	.050 <T	BDL	.	.120
OCT	.050 <T	.020 <T	.	.130
	.020 <T	BDL	.	.
NOV	.	.	.	.140
MANGANESE (UG/L)		DET'N LIMIT = .050		GUIDELINE = 50.0 (A3)
JAN	14.000	2.100	.	1.400

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
FEB	38.000	14.000	6.400	5.500
MAR	28.000	18.000	8.900	5.700
APR	180.000	6.700	.	5.500
MAY	ISM	.	.	.
JUN	42.000	9.600	5.000	4.600
JUL	ISM	3.700	7.000	3.700
AUG	100.000	1.300	.	.
SEP	59.000	.910	5.700	8.200
OCT	25.000	.860	2.100	1.900
	14.000	1.100	.	.
NOV	.	.	1.700	1.500
MOLYBDENUM (UG/L)		DET'N LIMIT = 0.020		GUIDELINE = 500 (N)
JAN	.630	.710	.	.680
FEB	.520	.920	.790	.830
MAR	.650	.900	.750	.710
APR	.060 <T	.370 <T	.	.490 <T
MAY	ISM	.	.	.
JUN	1.300	1.400	1.300	1.400
JUL	ISM	2.600	2.300	2.300
AUG	1.100	2.500	.	.
SEP	1.300	1.700	1.600	1.800
OCT	1.300	1.500	1.500	1.400
	1.100	1.100	.	.
NOV	.	.	1.300	1.300
NICKEL (UG/L)		DET'N LIMIT = 0.100		GUIDELINE = 50. (F3)
JAN	.250 <T	.900 <T	.	1.600
FEB	2.400	1.300 <T	1.600	1.300 <T
MAR	2.100	3.000	3.900	2.000
APR	5.000	2.500	.	2.600
MAY	ISM	.	.	.
JUN	3.100	1.800 <T	2.100	1.700 <T
JUL	ISM	4.800	5.300	5.500
AUG	4.400	2.200	.	.
SEP	11.000	9.100	4.400	4.300
OCT	4.200	4.100	1.800 <T	1.800 <T
	3.700	4.600	.	.
NOV	.	.	4.800	5.200
LEAD (UG/L)		DET'N LIMIT = 0.050		GUIDELINE = 50. (A1)
JAN	.500	.500	.	.950

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
FEB	1.400	.610	3.100	.530
MAR	.700	.120 <T	3.200	.390
APR	7.300	.170 <T	.	.240
MAY	ISM	.	.	.
JUN	.840	.380	2.300	.380
JUL	ISM	.300	3.100	.520
AUG	3.900	.230	.	.
SEP	1.900	.260	2.200	.410
OCT	1.100	.220	3.300	.510
	.710	.130 <T	.	.
NOV	.	.	4.100	.780
ANTIMONY (UG/L)		DET'N LIMIT = .050		GUIDELINE = 146. (D4)
JAN	.120 <T	.120 <T	.	.140 <T
FEB	.180 <T	.190 <T	.180 <T	.170 <T
MAR	.110 <T	.130 <T	.140 <T	.190 <T
APR	.080 <T	.120 <T	.	.140 <T
MAY	ISM	.	.	.
JUN	.310	.310	.280	.260
JUL	ISM	.410	.460	.300
AUG	.450	.640	.	.
SEP	.600	.750	.630	.650
OCT	.650	.620	.680	.740
	.540	.520	.	.
NOV	.	.	.770	.780
SELENIUM (UG/L)		DET'N LIMIT = 0.200		GUIDELINE = 10. (A1)
JAN	.720 <T	1.000 <T	.	1.400 <T
FEB	1.300 <T	1.100 <T	1.400 <T	1.100 <T
MAR	.930 <T	1.500 <T	1.000 <T	1.700 <T
APR	.480 <T	.370 <T	.	.210 <T
MAY	ISM	.	.	.
JUN	.230 <T	2.600 <T	1.300 <T	1.200 <T
JUL	ISM	4.000 <T	4.500 <T	3.100 <T
AUG	.880 <T	.810 <T	.	.
SEP	BDL	1.900 <T	1.300 <T	1.600 <T
OCT	BDL	6.500 <T	8.500 <T	7.300 <T
	5.900 <T	6.800 <T	.	.
NOV	.	.	6.900 <T	6.600 <T
STRONTIUM (UG/L)		DET'N LIMIT = .050		GUIDELINE = 2000.(N)
JAN	550.000	580.000	.	450.000

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
FEB	630.000	650.000	6[illegible].000	620.000
MAR	740.000	720.000	700.000	550.000
APR	300.000	300.000	.	340.000
MAY	ISM	.	.	.
JUN	960.000	880.000	860.000	850.000
JUL	ISM	900.000	990.000	980.000
AUG	660.000	630.000	.	.
SEP	890.000	820.000	850.000	880.000
OCT	850.000	830.000	830.000	750.000
	700.000	700.000	.	.
NOV	.	.	780.000	760.000
TITANIUM (UG/L)			DET'N LIMIT = .050	GUIDELINE = N/A
JAN	17.000	8.100	.	6.500
FEB	28.000	16.000	19.000	20.000
MAR	29.000	22.000	23.000	12.000
APR	39.000	17.000	.	16.000
MAY	ISM	.	.	.
JUN	9.600	5.700	5.200	5.000
JUL	ISM	8.800	9.500	9.300
AUG	32.000	21.000	.	.
SEP	26.000	12.000	13.000	12.000
OCT	15.000	5.700	6.000	5.900
	24.000	14.000	.	.
NOV	.	.	12.000	12.000
THALLIUM (UG/L)			DET'N LIMIT = .010	GUIDELINE = 13. (D4)
JAN	.030 <T	.030 <T	.	.020 <T
FEB	.040 <T	.030 <T	.040 <T	.030 <T
MAR	BDL	.020 <T	BDL	BDL
APR	.030 <T	BDL	.	BDL
MAY	ISM	.	.	.
JUN	BDL	BDL	BDL	.030 <T
JUL	ISM	.020 <T	.020 <T	BDL
AUG	BDL	BDL	.	.
SEP	BDL	BDL	BDL	BDL
OCT	.050 <T	BDL	BDL	BDL
	BDL	BDL	.	.
NOV	.	.	BDL	BDL
URANIUM (UG/L)			DET'N LIMIT = .020	GUIDELINE = 20. (A2)
JAN	1.500	1.500	.	.960

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
FEB	.980	.640	.750	.810
MAR	.810	.470	.800	.690
APR	.770	.290	.	.400
MAY	ISM	.	.	.
JUN	.610	.800	.760	.860
JUL	ISM	.560	.580	.590
AUG	.540	.250	.	.
SEP	.600	.440	.410	.460
OCT	.760	.430	.510	.480
	1.100	.680	.	.
NOV	.	.	.670	.570

VANADIUM (UG/L) DET'N LIMIT = .050 GUIDELINE = 100 (N)

JAN	.740	.500	.	.170 <T
FEB	1.400	.290 <T	.150 <T	.130 <T
MAR	.800	.330 <T	.260 <T	.090 <T
APR	2.800	.620	.	.380 <T
MAY	ISM	.	.	.
JUN	.910	.710	.180 <T	.170 <T
JUL	ISM	.690	.100 <T	.100 <T
AUG	2.500	.960	.	.
SEP	1.500	.570	.230 <T	.280 <T
OCT	1.100	.710	.440 <T	.560
	.690	.460 <T	.	.
NOV	.	.	.200 <T	.190 <T

ZINC (UG/L) DET'N LIMIT = .001 GUIDELINE = 5000. (A3)

JAN	6.000	3.600	.	3.400
FEB	16.000	7.800	59.000	7.600
MAR	15.000	7.900	100.000	6.500
APR	32.000	3.300	.	2.400
MAY	ISM	.	.	.
JUN	10.000	6.200	22.000	5.700
JUL	ISM	7.100	28.000	6.800
AUG	25.000	4.100	.	.
SEP	18.000	6.600	32.000	6.300
OCT	14.000	6.300	13.000	4.800
	12.000	7.100	.	.
NOV	.	.	48.000	8.200

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
CHLOROPHENOLS				
2&5-TRICHLOROPHENOL (NG/L)		DET'N LIMIT = 50.		GUIDELINE = 2600000(D4)
JUN	BDL	BDL	.	.
OCT	BDL	260.000 <T	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
PAH				
FLUORANTHENE (NG/L)			DET'N LIMIT = 20.000	GUIDELINE = 42000 (D4)
JAN	BDL	BDL	.	.
FEB	BDL	BDL	.	.
MAR	BDL	BDL	.	.
APR	80.000	BDL	.	.
MAY	BDL	BDL	.	.
JUN	BDL	BDL	.	.
JUL	BDL	BDL	.	.
AUG	BDL	BDL	.	.
SEP	BDL	BDL	.	.
OCT	BDL	BDL	.	.
	BDL	BDL	.	.
PYRENE (NG/L)			DET'N LIMIT = 20.000	GUIDELINE = 2.8 (D4T)
JAN	BDL	BDL	.	.
FEB	BDL	BDL	.	.
MAR	BDL	BDL	.	.
APR	80.000	BDL	.	.
MAY	BDL	BDL	.	.
JUN	BDL	BDL	.	.
JUL	BDL	BDL	.	.
AUG	BDL	BDL	.	.
SEP	BDL	BDL	.	.
OCT	BDL	BDL	.	.
	BDL	BDL	.	.
BENZO(A)ANTHRACENE (NG/L)			DET'N LIMIT = 20.000	GUIDELINE = 2.8 (D4T)
JAN	BDL	BDL	.	.
FEB	BDL	BDL	.	.
MAR	BDL	BDL	.	.
APR	20.000	BDL	.	.
MAY	BDL	BDL	.	.
JUN	BDL	BDL	.	.
JUL	BDL	BDL	.	.
AUG	BDL	BDL	.	.
SEP	BDL	BDL	.	.
OCT	BDL	BDL	.	.
	BDL	BDL	.	.
CHRYSENE (NG/L)			DET'N LIMIT = 50.000	GUIDELINE = 2.8 (D4T)
JAN	BDL	BDL	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
FEB	BDL	BDL	.	.
MAR	BDL	BDL	.	.
APR	100.000	BDL	.	.
MAY	BDL	BDL	.	.
JUN	BDL	BDL	.	.
JUL	BDL	BDL	.	.
AUG	BDL	BDL	.	.
SEP	BDL	BDL	.	.
OCT	BDL	BDL	.	.
	BDL	BDL	.	.

PERYLENE (NG/L) DET'N LIMIT = 10.000 GUIDELINE = 2.8 (D4T)

JAN	BDL	BDL	.	.
FEB	BDL	BDL	.	.
MAR	BDL	BDL	.	.
APR	50.000	BDL	.	.
MAY	BDL	BDL	.	.
JUN	BDL	BDL	.	.
JUL	BDL	BDL	.	.
AUG	BDL	BDL	.	.
SEP	BDL	BDL	.	.
OCT	BDL	BDL	.	.
	BDL	BDL	.	.

BENZO(K) FLUORANTHEN (NG/L) DET'N LIMIT = N/A GUIDELINE = 2.8 (D4T)

JAN	BDL	BDL	.	.
FEB	BDL	BDL	.	.
MAR	BDL	BDL	.	.
APR	19.000	BDL	.	.
MAY	BDL	BDL	.	.
JUN	BDL	BDL	.	.
JUL	BDL	BDL	.	.
AUG	BDL	BDL	.	.
SEP	BDL	BDL	.	.
OCT	BDL	BDL	.	.
	BDL	BDL	.	.

BENZO(A) PYRENE (NG/L) DET'N LIMIT = 5.000 GUIDELINE = 10 (B1)

JAN	BDL	BDL	.	.
FEB	BDL	BDL	.	.
MAR	BDL	BDL	.	.
APR	35.000	BDL	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
MAY	BDL	BDL	.	.
JUN	BDL	BDL	.	.
JUL	BDL	BDL	.	.
AUG	BDL	BDL	.	.
SEP	BDL	BDL	.	.
OCT	BDL	BDL	.	.
	BDL	BDL	.	.
BENZO(G,H,I) PERYLEN (NG/L)		DET'N LIMIT = 20.000		GUIDELINE = 2.8 (D4T)
JAN	BDL	BDL	.	.
FEB	BDL	BDL	.	.
MAR	BDL	BDL	.	.
APR	80.000	BDL	.	.
MAY	BDL	BDL	.	.
JUN	BDL	BDL	.	.
JUL	BDL	BDL	.	.
AUG	BDL	BDL	.	.
SEP	BDL	BDL	.	.
OCT	BDL	BDL	.	.
	BDL	BDL	.	.
DIBENZO(A,H) ANTHRAC (NG/L)		DET'N LIMIT = 10.000		GUIDELINE = 2.8 (D4T)
JAN	BDL	BDL	.	.
FEB	BDL	BDL	.	.
MAR	BDL	BDL	.	.
APR	10.000	BDL	.	.
MAY	BDL	BDL	.	.
JUN	BDL	BDL	.	.
JUL	BDL	BDL	.	.
AUG	BDL	BDL	.	.
SEP	BDL	BDL	.	.
OCT	BDL	BDL	.	.
	BDL	BDL	.	.
INDENO(1,2,3-C,D) PY (NG/L)		DET'N LIMIT = 20.000		GUIDELINE = 2.8 (D4T)
JAN	BDL	BDL	.	.
FEB	BDL	BDL	.	.
MAR	BDL	BDL	.	.
APR	80.000	BDL	.	.
MAY	BDL	BDL	.	.
JUN	BDL	BDL	.	.
JUL	BDL	BDL	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
AUG	BDL	BDL	.	.
SEP	BDL	BDL	.	.
OCT	BDL	BDL	.	.
	BDL	BDL	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
PESTICIDES & PCB				
ALPHA BHC (NG/L)			**DET'N LIMIT = 1.000**	**GUIDELINE = 700 (G)**
JAN	BDL	BDL	.	BDL
FEB	BDL	BDL	.	BDL
MAR	BDL	BDL	.	1.000 <T
APR	BDL	BDL	.	BDL
MAY	BDL	BDL	.	.
JUN	BDL	BDL	.	BDL
JUL	BDL	BDL	.	BDL
AUG	BDL	4.000 <T	.	.
SEP	BDL	5.000 <T	.	BDL
OCT	ILA	3.000 <T	.	1.000 <T
	1.000 <T	BDL	.	.
NOV	.	.	.	BDL
LINDANE (NG/L)			**DET'N LIMIT = 1.000**	**GUIDELINE = 4000 (A1)**
JAN	BDL	2.000 <T	.	1.000 <T
FEB	BDL	3.000 <T	.	BDL
MAR	2.000 <T	2.000 <T	.	2.000 <T
APR	BDL	2.000 <T	.	2.000 <T
MAY	BDL	2.000 <T	.	.
JUN	BDL	BDL	.	BDL
JUL	3.000 <T	5.000 <T	.	3.000 <T
AUG	3.000 <T	6.000 <T	.	.
SEP	BDL	9.000 <T	.	4.000 <T
OCT	ILA	7.000 <T	.	BDL
	4.000 <T	8.000 <T	.	.
NOV	.	.	.	3.000 <T
ATRAZINE (NG/L)			**DET'N LIMIT = 50.00**	**GUIDELINE = 60000 (B3)**
JAN	430.000 <T	280.000 <T	.	260.000 <T
FEB	BDL	BDL	.	BDL
MAR	BDL	BDL	.	BDL
APR	550.000	610.000	.	480.000 <T
MAY	IRO	BDL	.	.
JUN	BDL	BDL	.	BDL
JUL	BDL	BDL	.	BDL
AUG	320.000 <T	320.000 <T	.	.
SEP	140.000 <T	100.000 <T	.	150.000 <T
OCT	BDL	BDL	.	BDL
	230.000 <T	230.000 <T	.	.
NOV	.	.	.	210.000 <T

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
DES ETHYL ATRAZINE (NG/L)			DET'N LIMIT = N/A	GUIDELINE = N/A
JUL	BDL	BDL	.	BDL
AUG	BDL	BDL	.	.
SEP	BDL	BDL	.	BDL
OCT	BDL	BDL	.	BDL
NOV	380.000 <T	360.000 <T	.	.
	.	.	.	210.000 <T

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
PHENOLICS (UG/L)	PHENOLICS		DET'N LIMIT = 0.2	GUIDELINE = 2.00 (A3)
JAN	.600 <T	1.600	-	-
FEB	.600 <T	BDL	-	-
MAR	BDL	BDL	-	-
APR	BDL	BDL	-	-
MAY	1LD	-	-	-
JUN	2.800	3.200	-	-
JUL	1.000 <T	1.200	-	-
AUG	1.800	2.200	-	-
SEP	1.000 <T	1.000 <T	-	-
OCT	2.600	2.400	-	-
	2.400	2.400	-	-

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
VOLATILES				
BENZENE (UG/L)		**DET'N LIMIT = .050**		**GUIDELINE = 5.0 (81)**
JAN	1AV	1AV	.	1AV
APR	BDL	BDL	.	BDL
MAY	BDL	.	.	.
JUN	BDL	BDL	.	.300 <T
JUL	BDL	BDL	.	.100 <T
AUG	BDL	BDL	.	.
SEP	BDL	BDL	.	.100 <T
OCT	BDL	BDL	.	.250 <T
	BDL	BDL	.	.
NOV	.	.	.	BDL
TOLUENE (UG/L)		**DET'N LIMIT = .050**		**GUIDELINE = 24.0 (84)**
JAN	1AV	1AV	.	1AV
APR	BDL	BDL	.	BDL
MAY	BDL	.	.	.
JUN	BDL	.050 <T	.	BDL
JUL	BDL	.050 <T	.	BDL
AUG	BDL	BDL	.	.
SEP	BDL	BDL	.	BDL
OCT	BDL	BDL	.	BDL
	BDL	BDL	.	.
NOV	.	.	.	BDL
ETHYLBENZENE (UG/L)		**DET'N LIMIT = .050**		**GUIDELINE = 2.4 (84)**
JAN	1AV	1AV	.	1AV
APR	BDL	.100 <T	.	BDL
MAY	BDL	.	.	.
JUN	BDL	BDL	.	BDL
JUL	BDL	.050 <T	.	.100 <T
AUG	BDL	.050 <T	.	.
SEP	BDL	.050 <T	.	BDL
OCT	BDL	.100 <T	.	.100 <T
	BDL	BDL	.	.
NOV	.	.	.	BDL
M-XYLENE (UG/L)		**DET'N LIMIT = .100**		**GUIDELINE = 300 (84)**
JAN	1AV	1AV	.	1AV
APR	BDL	BDL	.	BDL
MAY	BDL	.	.	.
JUN	BDL	BDL	.	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
JUL	BDL	BDL	.	BDL
AUG	BDL	.200 <T	.	.
SEP	BDL	BDL	.	BDL
OCT	BDL	BDL	.	BDL
	BDL	BDL	.	.
NOV	.	.	.	BDL
O-XYLENE (UG/L)			DET'N LIMIT = .050	GUIDELINE = 300 (B4)
JAN	IAV	IAV	.	IAV
APR	BDL	BDL	.	BDL
MAY	BDL	.	.	.
JUN	BDL	BDL	.	BDL
JUL	BDL	BDL	.	BDL
AUG	BDL	.100 <T	.	.
SEP	BDL	BDL	.	BDL
OCT	BDL	BDL	.	BDL
	BDL	BDL	.	.
NOV	.	.	.	BDL
STYRENE (UG/L)			DET'N LIMIT = .050	GUIDELINE = 46.5 (D2)
OCT	BDL	BDL	.	.350
	.100 <T	.150 <T	.	.
NOV	.	.	.	.150 <T
CHLOROFORM (UG/L)			DET'N LIMIT = .100	GUIDELINE = 350 (A1+)
JAN	IAV	IAV	.	IAV
APR	.200 <T	31.900	.	13.900
MAY	.400 <T	.	.	.
JUN	.300 <T	162.000	.	129.000
JUL	BDL	141.000	.	123.000
AUG	2.100	142.000	.	.
SEP	BDL	116.700	.	131.300
OCT	.200 <T	130.000	.	126.500
	.400 <T	159.000	.	.
NOV	.	.	.	129.000
1,2 DICHLOROETHANE (UG/L)			DET'N LIMIT = .050	GUIDELINE = 5.0 (D1)
JAN	IAV	IAV	.	IAV
APR	BDL	BDL	.	BDL
MAY	BDL	.	.	.
JUN	BDL	BDL	.	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
JUL	BDL	.300 <T	.	BDL
AUG	BDL	BDL	.	.
SEP	BDL	BDL	.	BDL
OCT	BDL	BDL	.	BDL
	BDL	BDL	.	.
NOV	.	.	.	BDL
DICHLOROBROMOMETHANE (UG/L)		DET'N LIMIT = .050		GUIDELINE = 350 (A1+)
JAN	1AV	1AV	.	1AV
APR	BDL	4.350	.	1.400
MAY	BDL	.	.	.
JUN	BDL	32.600	.	25.000
JUL	BDL	34.650	.	27.750
AUG	.200 <T	23.800	.	.
SEP	BDL	27.900	.	21.150
OCT	BDL	32.450	.	33.450
	BDL	26.100	.	.
NOV	.	.	.	24.900
CHLORODIBROMOMETHANE (UG/L)		DET'N LIMIT = .100		GUIDELINE = 350 (A1+)
JAN	1AV	1AV	.	1AV
APR	BDL	.750 <T	.	.200 <T
MAY	BDL	.	.	.
JUN	BDL	3.800	.	3.900
JUL	BDL	8.500	.	5.900
AUG	BDL	3.200	.	.
SEP	BDL	5.200	.	4.200
OCT	BDL	8.100	.	6.700
	BDL	2.500	.	.
NOV	.	.	.	2.900
T-CHLOROETHYLENE (UG/L)		DET'N LIMIT = .050		GUIDELINE = 10.0 (C2)
JAN	1AV	1AV	.	1AV
APR	BDL	BDL	.	BDL
MAY	BDL	.	.	.
JUN	BDL	BDL	.	BDL
JUL	BDL	.050 <T	.	BDL
AUG	BDL	BDL	.	.
SEP	BDL	.100 <T	.	BDL
OCT	BDL	.200 <T	.	BDL
	BDL	.100 <T	.	.
NOV	.	.	.	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM CAYUGA WTP 1988

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1	
			STANDING	FREE FLOW
BROMOFORM (UG/L)			DET'N LIMIT = .200	GUIDELINE = 350 (A1+)
JAN	1AW	1AW	.	1AW
APR	BDL	BDL	.	BDL
MAY	BDL	.	.	.
JUN	BDL	BDL	.	BDL
JUL	BDL	BDL	.	BDL
AUG	BDL	BDL	.	.
SEP	BDL	BDL	.	BDL
OCT	BDL	.200 <T	.	.200 <T
	BDL	BDL	.	.
NOV	.	.	.	BDL
TOTL TRIHALOMETHANES (UG/L)			DET'N LIMIT = .500	GUIDELINE = 350 (A1)
JAN	1AW	1AW	.	1AW
APR	BDL	36.950	.	15.500
MAY	BDL	.	.	.
JUN	BDL	198.400	.	157.900
JUL	BDL	184.150	.	56.650
AUG	2.300 <T	169.000	.	.
SEP	BDL	149.800	.	156.850
OCT	BDL	170.750	.	166.850
	BDL	187.600	.	.
NOV	.	.	.	156.800

Table 6

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
BACTERIOLOGICAL			
STANDARD PLATE COUNT MEMBRANE FILTRATION	CT/ML	0	500/ML(A1)
P/A BOTTLE		0	0 (A1*)
TOTAL COLIFORM MEMBRANE FILTRATION	CT/100ML	0	5/100mL(A1)
TOTAL COLIFORM BACKGROUND MF	CT/100ML	0	N/A
CHLOROAROMATICS			
HEXACHLOROBUTADIENE	NG/L	1.000	450. (D4)
1,2,3-TRICHLOROBENZENE	NG/L	5.000	10000 (I)
1,2,3,4-TETRACHLOROBENZENE	NG/L	1.000	10000 (I)
1,2,3,5-TETRACHLOROBENZENE	NG/L	1.000	10000 (I)
1,2,4-TRICHLOROBENZENE	NG/L	5.000	10000 (I)
1,2,4,5-TETRACHLOROBENZENE	NG/L	1.000	38000 (D4)
1,3,5-TRICHLOROBENZENE	NG/L	5.000	10000 (D4)
HEXACHLOROBENZENE	NG/L	1.0	10. (C1)
HEXACHLOROETHANE	NG/L	1.000	1900. (D4)
OCTACHLOROSTYRENE	NG/L	1.000	N/A
PENTACHLOROBENZENE	NG/L	1.000	74000 (D4)
2,3,6-TRICHLOROTOLUENE	NG/L	5.000	N/A
2,4,5-TRICHLOROTOLUENE	NG/L	5.000	N/A
2,6,A-TRICHLOROTOLUENE	NG/L	5.000	N/A
CHLOROPHENOLS			
2,3,4-TRICHLOROPHENOL	NG/L	50.	N/A
2,3,4,5-TETRACHLOROPHENOL	NG/L	50.	N/A
2,3,5,6-TETRACHLOROPHENOL	NG/L	50.	N/A
2,4,5-TRICHLOROPHENOL	NG/L	50.	2600000 (D4)
2,4,6-TRICHLOROPHENOL	NG/L	50.	5000. (B1)
PENTACHLOROPHENOL	NG/L	50.	60000. (B1)
CHEMISTRY (FLD)			
FIELD COMBINED CHLORINE RESIDUAL	MG/L	N/A	N/A
FIELD FREE CHLORINE RESIDUAL	MG/L	N/A	N/A
FIELD TOTAL CHLORINE RESIDUAL	MG/L	N/A	N/A
FIELD PH	DMSNLESS	N/A	6.5-8.5(A4)
FIELD TEMPERATURE	°C	N/A	<15 °C(A1)
FIELD TURBIDITY	FTU	N/A	1.0 (A1)
CHEMISTRY (LAB)			
ALKALINITY	MG/L	.200	30-500(A4)
CALCIUM	MG/L	.100	100. (F2)
CYANIDE	MG/L	.001	.20(A1)
CHLORIDE	MG/L	.200	250. (A3)
COLOUR	TCU	.5	5.0 (A3)
CONDUCTIVITY	UMHO/CM	1.	400. (F2)
FLUORIDE	MG/L	.01	2.4 (A1)
HARDNESS	MG/L	.50	80-100(A4)
MAGNESIUM	MG/L	.05	30. (F2)

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
NITRITE	MG/L	.001	1.0 (A1)
TOTAL NITRATES	MG/L	.02	10. (A1)
NITROGEN TOTAL KJELDAHL	MG/L	.02	N/A
PH	DIMENSLESS	N/A	6.5-8.5(A4)
PHOSPHORUS FIL REACT	MG/L	.0005	N/A
PHOSPHORUS TOTAL	MG/L	.002	.40(P2)
TOTAL SOLIDS	MG/L	1.	500. (A3)
TURBIDITY	FTU	.02	1.0 (A1)
METALS			
ALUMINUM	UG/L	.050	100. (A4)
ANTIMONY	UG/L	.050	146. (D4)
ARSENIC	UG/L	.050	50. (A1)
BARIUM	UG/L	.020	1000. (A1)
BORON	UG/L	.200	5000. (A1)
BERYLLIUM	UG/L	.010	0.20 (H)
CADMIUM	UG/L	.050	5.0 (A1)
COBALT	UG/L	.020	1000. (H)
CHROMIUM	UG/L	.100	50. (A1)
COPPER	UG/L	.100	1000. (A3)
IRON	UG/L	5.0	300. (A3)
MERCURY	UG/L	.01	1.0 (A1)
MANGANESE	UG/L	.050	50. (A3)
MOLYBDENUM	UG/L	.020	500. (H)
NICKEL	UG/L	.100	50. (P3)
LEAD	UG/L	.020	50. (A1)
SELENIUM	UG/L	.200	10. (A1)
SILVER	UG/L	.020	50. (A1)
STRONTIUM	UG/L	.100	2000. (H)
THALLIUM	UG/L	.010	13. (D4)
TITANIUM	UG/L	.100	N/A
URANIUM	UG/L	.020	20. (A2)
VANADIUM	UG/L	.020	100. (H)
ZINC	UG/L	.020	5000. (A3)
PHENOLICS			
PHENOLICS (UNFILTERED REACTIVE)	UG/L	.2	2.0 (A3)
PESTICIDES & PCB			
ALDRIN	NG/L	1.0	700. (A1)
AMETRINE	NG/L	50.	300000. (D3)
ATRAZINE	NG/L	50.	60000. (B3)
ALPHA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	700. (G)
BETA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	300. (G)
GAMMA HEXACHLOROCYCLOHEXANE(LINDANE)	NG/L	1.0	4000. (A1)
ALPHA CHLORDANE	NG/L	2.0	7000. (A1)
GAMMA CHLORDANE	NG/L	2.0	7000. (A1)
BLADEX	NG/L	100.	10000. (B3)
DIELDRIN	NG/L	2.0	700. (A1)
METHOXYCHLOR	NG/L	5.0	100000. (A1)
ENDOSULFAN 1 (THIODAN I)	NG/L	2.0	74000. (D4)
ENDOSULFAN 2 (THIODAN II)	NG/L	4.0	74000. (D4)
ENDRIN	NG/L	4.0	200. (A1)
ENDOSULFAN SULPHATE(THIODAN SULPHATE)	NG/L	4.0	N/A
HEPTACHLOR EPOXIDE	NG/L	1.0	3000. (A1)

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE	
HEPTACHLOR	NG/L	1.0	3000.	(A1)
METOLACHLOR	NG/L	500.	50000.	(B3)
MIREX	NG/L	5.0	N/A	
OXYCHLORDANE	NG/L	2.0	N/A	
O,P-DDT	NG/L	5.0	30000.	(A1)
PCB	NG/L	20.0	3000.	(A2)
O,P-DDD	NG/L	5.0	N/A	
PPDDE	NG/L	1.0	30000.	(A1)
PPDDT	NG/L	5.0	30000.	(A1)
ATRATONE	NG/L	50.	N/A	
ALACHLOR	NG/L	500.	35000.	(D2)
PROMETONE	NG/L	50.	52500.	(D3)
PROPAZINE	NG/L	50.	16000.	(D2)
PROMETRYNE	NG/L	50.	1000.	(B3)
SENCOR (METRIBUZIN)	NG/L	100.	80000.	(B2)
SIMAZINE	NG/L	50.	10000.	(B3)
POLYAROMATIC HYDROCARBONS				
PHENANTHRENE	NG/L	10.0	N/A	
ANTHRACENE	NG/L	1.0	N/A	
FLUORANTHENE	NG/L	20.0	42000.	(D4)
PYRENE	NG/L	20.0	N/A	
BENZO(A)ANTHRACENE	NG/L	20.0	N/A	
CHRYSENE	NG/L	50.0	N/A	
DIMETHYL BENZO(A)ANTHRACENE	NG/L	5.0	N/A	
BENZO(E)PYRENE	NG/L	50.0	N/A	
BENZO(B)FLUORANTHENE	NG/L	10.0	N/A	
PERYLENE	NG/L	10.0	N/A	
BENZO(K)FLUORANTHENE	NG/L	1.0	N/A	
BENZO(A)PYRENE	NG/L	5.0	10.	(B1)
BENZO(G,H,I)PERYLENE	NG/L	20.0	N/A	
DIBENZO(A,H)ANTHRACENE	NG/L	10.0	N/A	
INDENO(1,2,3-C,D)PYRENE	NG/L	20.0	N/A	
BENZO(B)CHRYSENE	NG/L	2.0	N/A	
CORONENE	NG/L	10.0	N/A	
SPECIFIC PESTICIDES				
TOXAPHENE	NG/L	N/A	5000.	(A1)
2,4,5-TRICHLOROBUTYRIC ACID (2,4,5-T)	NG/L	50.	280000.	(B1)
2,4-DICHLOROBUTYRIC ACID (2,4-D)	NG/L	100.	100000.	(A1)
2,4-DICHLORORPHENOXYBUTYRIC ACID	NG/L	200.	18000.	(B3)
2,4-D PROPIONIC ACID	NG/L	100.	N/A	
DICAMBA	NG/L	100.	87000.	(B3)
PICHLORAM	NG/L	100.	2450000.	(D3)
SILVEX (2,4,5-TP)	NG/L	50.	10000.	(A1)
DIAZINON	NG/L	20.	14000.	(A1)
DICHLOROVOS	NG/L	20.	N/A	
DURSBAN	NG/L	20.	N/A	
ETHION	NG/L	20.	35000.	(G)
GUTHION	NG/L	N/A	N/A	
MALATHION	NG/L	20.	160000.	(G)
MEVINPHOS	NG/L	20.	N/A	
METHYL PARATHION	NG/L	50.	7000.	(B3)
METHYLTRITHION	NG/L	20.	N/A	
PARATHION	NG/L	20.	35000.	(B1)

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
PHORATE (THIMET)	NG/L	20.	35. (D2)
RELDAN	NG/L	20.	N/A
RONNEL	NG/L	20.	N/A
AMINOCARB	NG/L	N/A	N/A
BENONYL	NG/L	N/A	N/A
BUX (METALKAMATE)	NG/L	2000.	N/A
CARBOFURAN	NG/L	2000.	18000. (D3)
CICP (CHLORPROPHAM)	NG/L	2000.	350000. (G)
DIALLATE	NG/L	2000.	30000. (H)
EPTAM	NG/L	2000.	N/A
IPC	NG/L	2000.	N/A
PROPOXUR (BAYGON)	NG/L	2000.	90000. (G)
SEVIN (CARBARYL)	NG/L	200.	70000. (A1)
SUTAN (BUTYLATE)	NG/L	2000.	245000. (D3)
VOLATILES			
BENZENE	UG/L	.050	5.0 (B1)
TOLUENE	UG/L	.050	24.0 (B4)
ETHYLBENZENE	UG/L	.050	2.4 (B4)
PARA-XYLENE	UG/L	.100	300. (B4)
META-XYLENE	UG/L	.100	300. (B4)
ORTHO-XYLENE	UG/L	.050	300. (B4)
1,1-DICHLOROETHYLENE	UG/L	.100	7.0 (D1)
ETHLYENE DIBROMIDE	UG/L	.05	50. (G)
METHYLENE CHLORIDE	UG/L	.500	1750. (D3)
TRANS-1,2-DICHLOROETHYLENE	UG/L	.100	350. (D3)
1,1-DICHLOROETHANE	UG/L	.100	N/A
CHLOROFORM	UG/L	.100	350. (A1+)
1,1,1-TRICHLOROETHANE	UG/L	.020	200. (D1)
1,2-DICHLOROETHANE	UG/L	.050	5.0 (D1)
CARBON TETRACHLORIDE	UG/L	.200	5.0 (D1)
1,2-DICHLOROPROPANE	UG/L	.050	10.0 (G)
TRICHLOROETHYLENE	UG/L	.100	5.0 (D1)
DICHLOROBROMOMETHANE	UG/L	.050	350. (A1+)
1,1,2-TRICHLOROETHANE	UG/L	.050	.60(D4)
CHLORODIBROMOMETHANE	UG/L	.100	350. (A1+)
TETRACHLOROETHYLENE	UG/L	.050	10.0 (C2)
BROMOFORM	UG/L	.200	350. (A1+)
1,1,2,2-TETRACHLOROETHANE	UG/L	.050	0.17(D4)
CHLOROBENZENE	UG/L	.100	1510. (D3)
1,4-DICHLOROBENZENE	UG/L	.100	5.0 (B1)
1,3-DICHLOROBENZENE	UG/L	.100	130. (G)
1,2-DICHLOROBENZENE	UG/L	.050	200. (B1)
TRIFLUOROCHLOROTOLUENE	UG/L	.100	N/A
TOTAL TRIHALOMETHANES	UG/L	.500	350. (A1)
STYRENE	UG/L	.05	46.5 (D2)

Appendix A

DRINKING WATER SURVEILLANCE PROGRAM

The Drinking Water Surveillance Program (DWSP) for Ontario monitors drinking water quality at municipal water supply systems. The DWSP Database Management System provides a computerized drinking water quality information system for the supplies monitored. The objectives of the program are to provide:

- immediate, reliable, current information on drinking water quality,
- a flagging mechanism for 'Objective' exceedence,
- a definition of contaminant levels and trends,
- a comprehensive background for remedial action,
- a framework for assessment of new contaminants,
- and an indication of treatment efficiency of plant processes.

Program

The DWSP officially began in April 1986 and is designed to eventually include all municipal water supplies in Ontario; currently 44 plants are being monitored. Water supply locations have been prioritized for surveillance, based primarily on criteria such as population density, probability of contamination and geographical location.

An ongoing assessment of future monitoring requirements at each location will be made. Monitoring will continue at the initial locations at an appropriate level and further locations will be phased into the program as resources permit. It is estimated that after 4 years of operation, the program will be monitoring 90 locations.

A major goal of the program is to collect valid water quality data, in context with plant operational characteristics at the time of sampling. As soon as sufficient data have been accumulated and analysed, both the frequency of sampling and the range of parameters may be adjusted accordingly.

Assessments are carried out at all locations prior to initial sampling in order to acquire complete plant process and distribution system details, and to designate (and retrofit if necessary) all sampling systems and locations. This ensures that the sampled water is a reflection of the water itself.

Samples are taken of the raw (ambient water) and the treated water at the treatment plant, and of consumer's tap water in the distribution system. In order to determine possible effects of distribution on water quality, both standing and free flow water in old and new sections of the distribution system are sampled.

Sampling is carried out by operational personnel who have been trained in the applicable procedures.

Comprehensive standardized procedures and Field Test kits are supplied to sampling personnel. This ensures that samples are taken and handled according to standard protocols and that field testing will supply reliable data. All field and laboratory analyses are carried out using "approved documented procedures". All laboratory analyses are carried out by the MOE Laboratory Services Branch.

Data Reporting Mechanism

When the analytical results are transferred from the MOE laboratory into the DWSP system, printouts of the completed analyses are sent to the MOE District Officer, the appropriate operational staff and are also retained by the DWSP co-ordinator.

DWSP INPUTS AND OUTPUTS

The DWSP INPUTS and OUTPUTS are illustrated in Fig. 1.

PROGRAM INPUTS

PLANT AND DISTRIBUTION SYSTEM DESCRIPTION

The system description includes plant specific non-analytical information acquired through a questionnaire and initial plant

visit. During the initial assessment of the plant and distribution system the questionnaire content is verified and missing information added. It is intended that all data be kept current with scheduled annual updates.

The PLANT and DISTRIBUTION SYSTEM DESCRIPTION consists of the following seven components.

1. Process component inventory

All physical and chemical processes that the water is subjected to, from the intake pipe to the consumers' tap (where possible), are documented. These include: process type, general description of physical structures, material types, sizes, and retention time for each process within the plant. The processes may be as simple as transmission or as complex as carbon adsorption.

2.Treatment chemicals

Chemicals used in the treatment processes, their function, application point, supplier and brand-name are recorded. The chemical dosages applied on the day of sampling are recorded in DWSP.

3. Process control measurements

Documentation of in-plant monitoring of process parameters (turbidity, chlorine residuals, pH, aluminum residuals) including methods used, monitoring locations and frequency is contained in

this section. In-plant monitoring results are generally not retained in DWSP but are retained by the Water Treatment Plant.

4. Design flow and retention time

The hydraulic capacity, designed and actual, is noted here. Retention time (the time that a block of water is retained in the plant) is also noted. The maximum, minimum and average flow as well as a record of the flow rate on the day of sampling are recorded in DWSP.

5. Distribution system description

This area includes the storage and transmission characteristics of the distribution system after the water leaves the plant.

6. Sampling system

Each plant is assessed for its adequacy in terms of sampling of bacteriological, organic and inorganic parameters. The prime considerations in the assessment and design of the sampling system are:

i/ the sample is an accurate representation of the actual water condition, eg. raw water has had no chemical treatment;

ii/ the water being sampled is not being modified by the sampling system;

iii/ the sample tap must be in a clean area of the plant,

preferably a lab area;

iv/ the sample lines must be organically inert (no plastic, ideally stainless steel).

It is imperative that the sampled water be a reflection not of the sampling system but of the water itself.

The sampling system documentation includes: origin of the water; date sampling was initiated; size, length and material type (intake, discharge and tap), pump characteristics (model, type, capacity) and flow rate.

7. People

This section contains the names, addresses and phone numbers of current plant management and operational staff, distribution system management and operational staff, Medical Officer of Health and appropriate Ministry of Environment personnel associated with the plant.

FIELD DATA

The second major input to DWSP is field data.

Field data is collected at the plant and from the distribution system sites on the day of sampling. The field data consists of general operating conditions and the results of testing for field parameters. General operating conditions include chemicals used,

dosages, flow and retention time on the day of sampling as well as monthly maximum, minimum and average flows. Field parameters include turbidity, chlorine residuals (free,combined and total), temperature and pH. These parameters are analysed according to standardized DWSP protocols to allow for interplant comparison.

LABORATORY ANALYTICAL DATA

The third major input to DWSP is Laboratory Analytical Data.

Samples gathered from the raw, treated and distribution sampling sites are analyzed for approximately 160 parameters at a frequency of two to twelve times per year. Sixty-five percent of the parameters are organic. The parameters measured may have health or aesthetic implications when present in drinking water. Many of the parameters may be used in the treatment process or may be treatment by-products. Due to the nature of certain analytical instruments parameters may be measured for in a "scan" producing some results for parameters that are not on the DWSP priority list but which may be of interest. The majority of the parameters are measured on a routine basis however, those that are technically more difficult and/or costly to analyse for are done less frequently. These include Specific Pesticides and Chlorophenols.

Although the parameter list is extensive, additional parameters with the potential to cause health or aesthetic related problems

may be added provided reliable analytical and sampling methods exist.

All laboratory generated data is derived from standardized, documented analytical protocols. The analytical method is an integral part of the data and as methods change notation will e be made and intercomparison data documented.

PARAMETER REFERENCE INFORMATION

The fourth major input to DWSP is Parameter Reference Information

This is a catalogue of information for each substance analysed on DWSP. It includes parameter name and aliases, physical and chemical properties, basic toxicology, world-wide health limits, treatment methods and uses. The Parameter Reference Information is computerized and can be accessed through the Query function of the DWSP database.

An example is shown in fig. 2.

A written copy (hard version) of the Parameter Reference Information will be available in the near future and is a new and sophisticated enhancement to the DWSP.

PROGRAM OUTPUTS

There are four major program outputs, Query, Action Alert, Report Generation and the Annual Report.

QUERY

All DWSP information is easily accessed through the Query function, therefore anything from addresses of plant personnel to complete water quality information for a plant's water supply is instantly available. The DWSP computer system makes relatively complex inquiries manageable. A personal password allowing access into the DWSP query mode in all MOE offices is being developed by the DWSP group.

ACTION ALERTS

Drinking Water quality in Ontario is evaluated against provincial objectives as outlined in the publication, Ontario Drinking Water Objectives (ISBN 0-7729-2725-1 revised 1983). This publication contains health-related Maximum Acceptable Concentrations for thirty substances. Should the reported level of a substance in treated water exceed the Ontario Drinking Water Objective an "Action Alert" requiring resampling and confirmation is issued. This assures that operational staff, health authorities and the public are notified as soon as possible of confirmation of an exceedance and remedial action taken. This report supplies a history of the occurrence of past exceedences at the plant plus a historical summary on the parameter of concern.

In the absence of Ontario Drinking Water Objectives, other agency guidelines which are documented in the Parameter Reference Information may be used. If these guidelines are exceeded the results are flagged and evaluated by DWSP personnel. An "Action Alert" will be issued if warranted.

REPORT GENERATION

Custom reports can be generated from DWSP to meet the needs of the regions and to respond to public requests.

ANNUAL REPORTS

It is the practice of DWSP to produce an annual report containing analytical data along with companion plant information.

FIG. 1

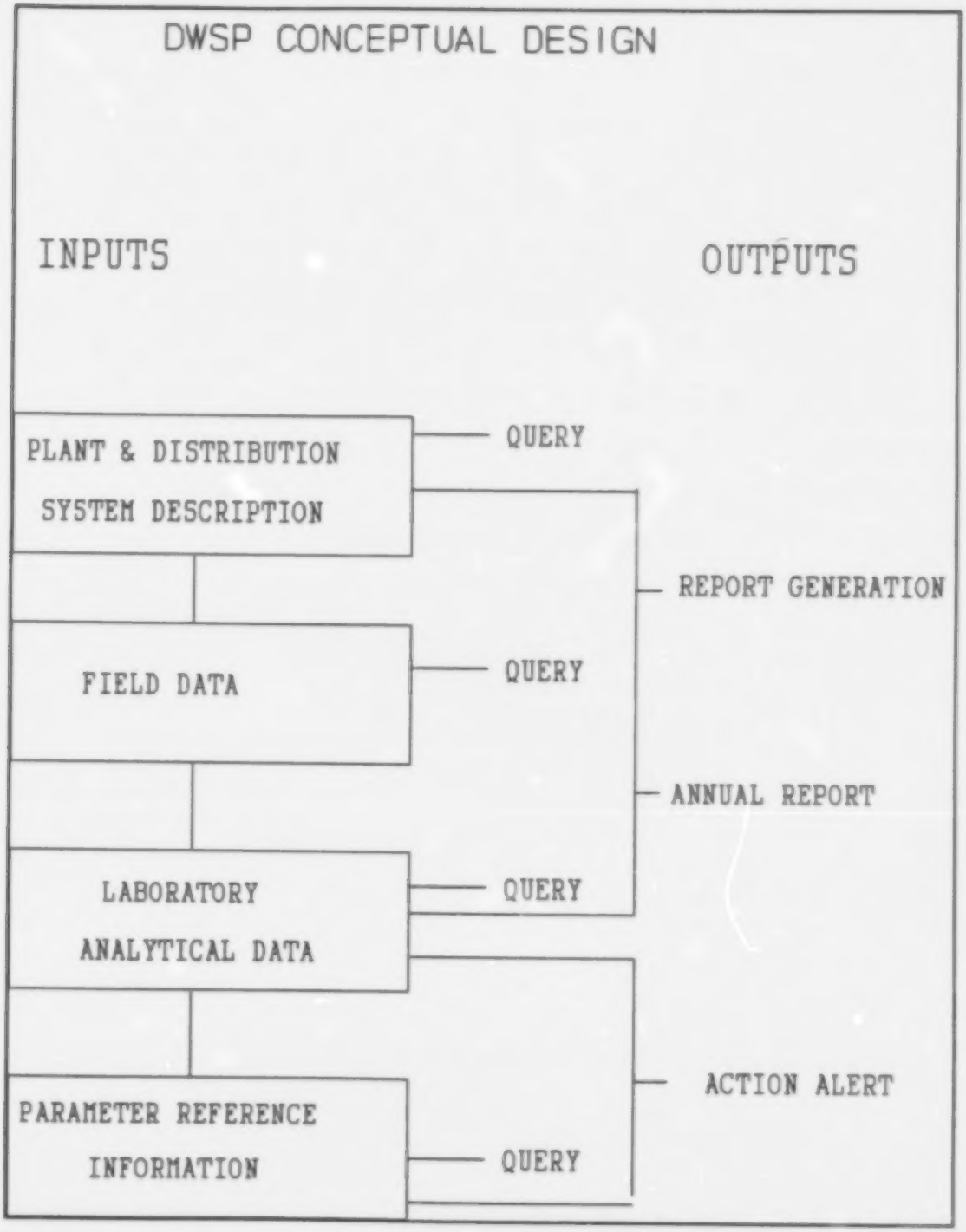
DWSP CONCEPTUAL DESIGN
INPUTS
OUTPUTS
PLANT & DISTRIBUTION SYSTEM DESCRIPTION
QUERY
REPORT GENERATION
FIELD DATA
QUERY
ANNUAL REPORT
LABORATORY ANALYTICAL DATA
QUERY
ACTION ALERT
PARAMETER REFERENCE INFORMATION
QUERY

FIG.2

MOE - DRINKING WATER ASSESSMENT PROGRAM (DWSP)

(B2001P) PARAMETER REFERENCE
BENZENE

SOURCE	FROM	TO	METHOD	TARG	UNIT	NOTE
EPA	C 86/04		NOMETH	.00	063000 UG/L	RMCL
EPAA	C 80/11		NOMETH	6.60	063000 UG/L	
FERC	C 84/05		NOMETH	1.00	063000 UG/L	
WHO	C 84/01		NOMETH	10.00	064000 UG/L	

DESCRIPTION: NAME: BENZENE
CAS#: 71432
MOLECULAR FORMULAE: C_6H_6
DETECTION LIMIT: (FOR METHOD POCODO) 0.05 UG/L
SYNONYMS: BENZOLE, COAL NAPHTHA, CARBON OIL (27), CYCLOHEXATRIENE (41)
CHARACTERISTICS: COLOURLESS TO LIGHT YELLOW, MOBILE, NON-POLAR LIQUID, OF HIGHLY REFRACTIVE NATURE, AROMATIC, VAPOURS BURN WITH SMOKING FLAME (30)
PROPERTIES:
SOLUBILITY IN WATER: 1780-1800 MG/L AT 25 DEG C (41)
THRESHOLD ODOUR: NO DATA
THRESHOLD TASTE: 0.5 MG/L IN WATER (39)
ENVIRONMENTAL FATE: MAY BIOACCUMUALTE IN LIVING ORGANISMS, APPEARS TO BIOACCUMULATE IN ANIMAL TISSUES THAT EXHIBIT HIGH LIPID CONTENT OR ARE MAJOR METABOLIC SITES (LIVER, BRAIN), SMALL QUANITIES EVAPORATE FROM SOIL OR DEGRADE QUICKLY
SOURCES: PETROLEUM REFINING, SOLVENT RECOVERY, COAL TAR DISTILLATION, FOOD PROCESSING, TANNING.
USES: PREPERATION OF ETHYL BENZENE USED AS A STYRENE MONOMER, DETERGENTS, NYLON, AS INTERMEDIATE IN PESTICIDE PRODUCTION, SOLVENT IN RUBBER INDUSTRY, DEGREASING AND CLEANSING AGENT, GASOLINE.
TOXICITY: RATING 4 (VERY TOXIC); ACUTE - IRRITATES MUCOUS MEMBRANES, SYMPTONS INCLUDE RESTLESSNESS, CONVULSIONS, DEPRESSION, RESPIRATORY FAILURE; CHRONIC - ANEMIA AND LEUKEMIA (45).
CARINOGENICITY: HUMAN CARCINOGEN AND MUTAGEN
REMOVAL: GAC ADSORPTION, PRECIPITATION WITH ALUM FOLLOWED BY SEDIMENTATION, COAGULATION AND FLOCCULATION, SOLVENT EXTRACTION, OXIDATION (41).
MOLECULAR WEIGHT: 78.12 GRAMS
MELTING POINT: 5.5 DEGREES C (27)
BOILING POINT: 80.1 DEGREES C (27)
SPECIFIC GRAVITY: 0.879 AT 20 DEGREES C (27)
VAPOUR PRESSURE: 100 MM AT 26.1 DEGREES C
HENRY'S LAW CONSTANT: 0.00555 ATM M_3/MOLE
LOG OCT./WATER PAR.COEFF: K=1.0 1/N=1.6 R=.97 PH=5.3

Appendix B

DWSP SAMPLING GUIDELINE

i) RAW and TREATED at PLANT

General Chemistry	-500 mL clear plastic bottle -rinse bottle with sample three times and discard water -fill to line
Bacti	-250 mL clear glass bottle with white seal on cap -do <u>not</u> rinse bottle; preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL clear plastic bottle with white lid -rinse bottle and cap three times, discard -fill to line -add 10 drops nitric acid (**Caution:** HNO_3 is corrosive)
Volatiles (OPOPUP)	-250 mL clear glass bottle -do <u>not</u> rinse bottle -tilt bottle when filling -fill bottle completely; there should be no air bubbles.
Organic (OWOC),(OWTRI),(OAPAHX)	-1 liter brown glass bottle per scan -do <u>not</u> rinse bottle -fill to approx. 1" from top -when 'special pesticides' are requested three extra bottles per sample must be submitted
Cyanide	-500 mL clear plastic bottle -do <u>not</u> rinse bottle -fill to approx. 1" from top -add 10 drops sodium hydroxide (**Caution:** NaOH is corrosive)

Mercury	-250 mL clear glass bottle -rinse bottle and cap three times, discard then fill to top of label -add 20 drops each nitric acid and potassium dichromate (**Caution:** HNO_3 and $KCrO_7$ corrosive)
Phenols	-250 mL clear glass bottle -do <u>not</u> rinse bottle -fill to top of label as marked

<u>Steps</u>

1. Let cold water tap run for several minutes.
2. Record time in submission sheet.
3. Record teperature on submission sheet.
4. Fill up all bottles as per instructions.
5. Record chlorine residuals (free, combined and total for treated water only), turbidity and pH on submission sheet.

ii) Distribution Samples (standing water)

General Chemistry	-500 mL clear palstic bottle -rinse bottle with sample three times and discard -fill to line
Metals	-500 mL clear plastic bottle with white lid -rinse bottle and cap three times, discard -fill to line -add 10 drops nitric acid (Caution: HNO_3 is corrosive)

Steps:

1. Record time on submission sheet.
2. Place bucket under tap and open cold water.
3. Fill to predetermined volume.
4. After mixing the water, record the temperature on the submission sheet.
5. Fill general chemistry and metals bottles.
6. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

iii) Distribution Samples (free flow)

General Chemistry	-500 mL clear plastic bottle -rinse bottle with sample three times and discard water -fill to line
Bacti	-250 mL clear glass bottle with white seal on cap -do <u>not</u> rinse bottle; preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL clear plastic bottle with white lid -rinse bottle and cap three times, discard -fill to line -add 10 drops nitric acid (**Caution:** HNO_3 is corrosive)
Volatiles (OPOPUP)	-250 mL clear glass bottle -do <u>not</u> rinse bottle; preservative has been added -tilt bottle when filling -fill bottle completely; there should be no air bubbles
Organic (OWOC),(OWTRI)	-1 liter brown glass bottle per scan -do <u>not</u> rinse bottle: preservative has been added -fill to approx. 1" from top
Cyanide	-500 mL clear plastic bottle -do <u>not</u> rinse bottle: preservative has been added -fill to approx. 1" from top -add 10 drops sodium hydroxide (**Caution:** NaOH is corrosive)
Mercury	-250 mL clear glass bottle -rinse bottle and cap three times, discard then fill to top of label -add 20 drops each nitric acid and potassium dichromate (**Caution:** HNO_3 and KCrO7 corrosive)

Steps:

1. Record time on submission sheet.
2. Let cold water flow for ten minutes.
3. Record temperature on submission sheet.
4. Fill all bottles as per instructions.
5. Record chlorine residuals (free, combined and total), tubidity and pH on submission sheet.